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San Francisco, California  
2007







# ELECTRIC RAILWAY JOURNAL



## KEYSTONE SPECIALTIES

ARE STANDARD ON THE  
BIRNEY SAFETY CAR

AND THOUSANDS OF OTHER CARS

### ELECTRIC SERVICE SUPPLIES Co.

*Manufacturer of Railway Material and Electrical Supplies*

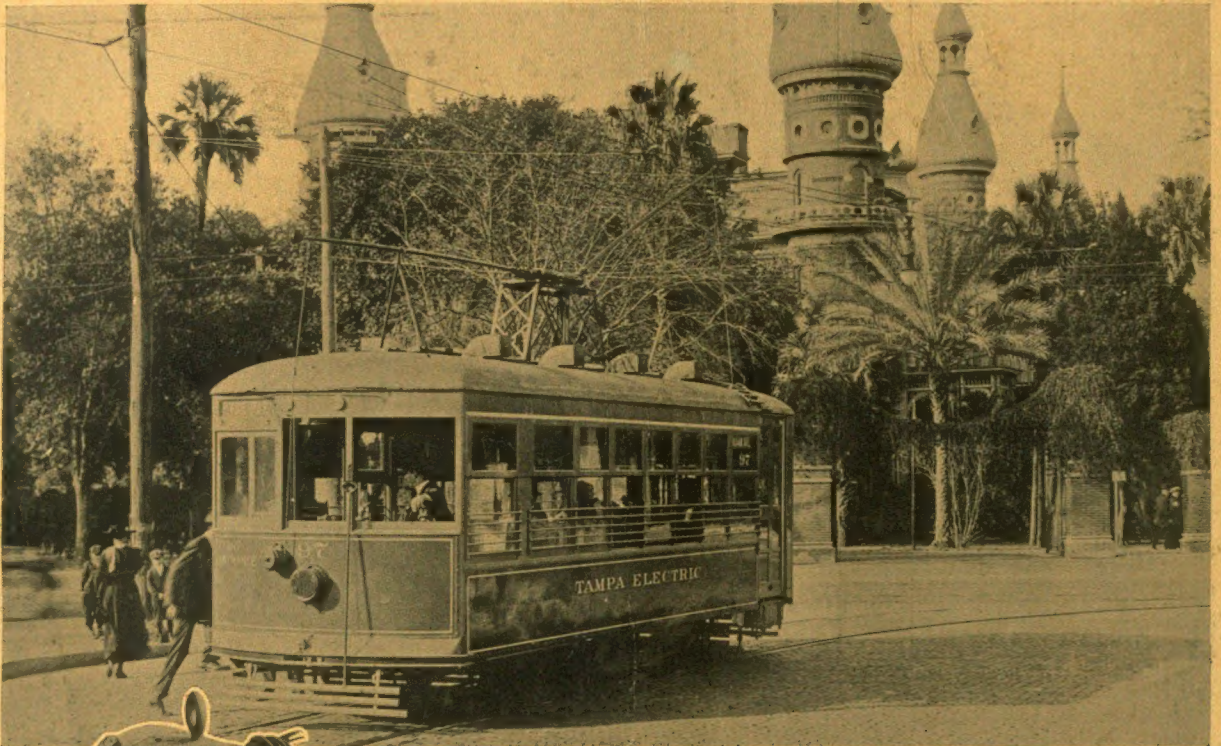
PHILADELPHIA

PITTSBURGH

NEW YORK

CHICAGO





No. 506 Motor  
Showing Ball Bearings

**No. 506 Motors**  
with either  
Ball or Sleeve Armature Bearings  
for



No. 506 Motor  
Showing Sleeve Bearings

## **Safety Cars**

### **Safety Car Facts:**

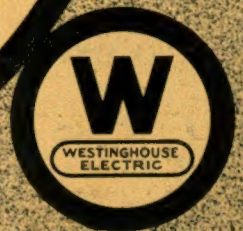
Four old-type cars on 20-minute headway and 40-minute round trip were replaced by six Birney cars on 12-minute headway and 36-minute round trip. With the same power consumption the results are:

15% increase in gross returns.

25% reduction in platform labor.

With these economies and reasonable increase in fare, roads can operate.

Westinghouse Electric & Manufacturing Co.  
East Pittsburgh, Pa.  
Sales Offices in All Large American Cities



# **Westinghouse**



# Electric Railway Journal

H. W. BLAKE, *Editor*

## Contents

### Hints for the Electric Railway Freight Operator

A. B. Cole declares that market train service offers lucrative field for electric railways. How interchanged equipment should be cared for. When motor cars, trailers and electric locomotives should be used. Proper signaling is necessary for safe freight operation.....Page 396

### How Can the Public Be Convinced?

Replies to questionnaire sent out by this journal to public men express conviction that the public will respond to a frank and honest presentation of facts if good service is provided and the companies ask for a return on only a fair valuation.....Page 408

### Ethical Aspects of the Electric Railway Situation

R. T. Sullivan analyzes the causes of the fare trouble and suggests remedies. He believes that the fallacy of a fixed fare has won widespread recognition and believes the railways are "at the dawn of a better day".....Page 413

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## McGRAW-HILL COMPANY, INC., 10th Ave. at 36th Street, NEW YORK

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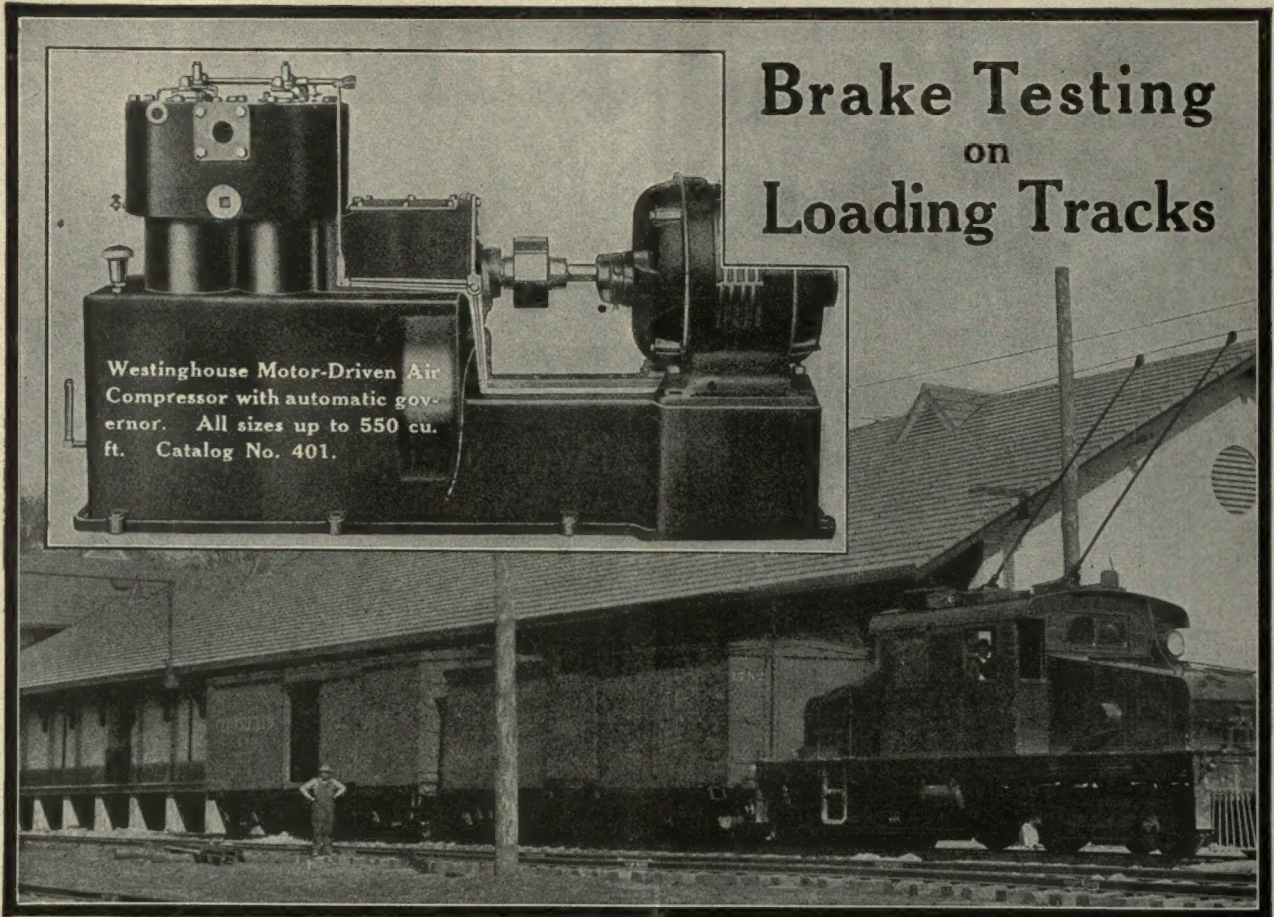
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Power  
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Engineering News-Record

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Circulation of this issue, 7050 copies





## Brake Testing on Loading Tracks

Westinghouse Motor-Driven Air Compressor with automatic governor. All sizes up to 550 cu. ft. Catalog No. 401.

Cars being loaded on freight house tracks offer an excellent opportunity for the inspector to test and condition the air brakes before the cars are switched into the train and sent on their journey. Train detentions, due to neglected air brakes, will be largely reduced if an air compressor be installed in the freight house and the loading tracks be piped to carry air to the cars.

### **Westinghouse Electrically-Driven Air Compressors, Being Compact, Efficient and Durable,**

are specially suited to air brake testing plants of all kinds and sizes, and particularly to those isolated plants which require compressors automatically controlled, of thorough reliability, and which need little attention to operate and maintain.

## **Westinghouse Traction Brake Company**

General Offices and Works, Wilmerding, Pa.

Atlanta, Ga.  
Boston, Mass.  
Chicago, Ill.  
Columbus, O

Denver, Col.  
Houston, Tex.  
Los Angeles, Cal.



Mexico City  
New York, N. Y.  
Pittsburgh, Pa.

San Francisco.  
Seattle, Wash.  
St. Louis, Mo.  
St. Paul, Minn.



THOUSANDS OF KILOWATTS

10  
9  
8  
7  
6  
5  
4  
3*Underfeed**The Westinghouse  
Underfeed Stoker  
is built for****Calm or Storm  
In Power House Load***

The ease with which it takes the crest  
of the central station peak, denotes—

**A Wide Operating Range  
and Great Elasticity of Operation**

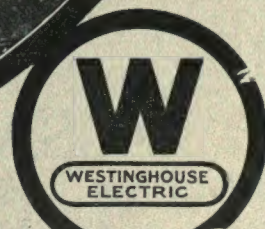
If the load served is constant, without the daily peaks, the enormous overload capacity of the Westinghouse Underfeed Stoker stands as a RESERVE to be utilized in any emergency, or as natural business growth calls for additional steaming capacity.

There is no stoker on which higher guarantees of efficiency can be made over its entire operating range.

There is no stoker which will burn a wider variety of fuels more satisfactorily.

However, remember that the choice of a stoker always narrows down to a study of individual plant requirements, and when all things are considered—such as foundations, headroom limitations, first cost, etc., the choice may point to the Westinghouse Roney, or the Westinghouse Chain Grate, as best meeting your specific requirements.

Westinghouse Electric & Mfg. Co.  
East Pittsburgh, Pa.



# Westinghouse





## It Pays to Add Service when you use Safety Car Control Equipment

Service, *service* and still more service is the answer to automobile competition whether public or private.

But there is only one way to give that additional service at a profit.

That way is to equip your cars—whether new or old—with Safety Car Control Equipments.

By enabling you to use one operator instead of two, and to run the cars on shorter headways with notable improvements in speed and safety, our Safety Equipments permit you to—

Recapture and create traffic that is obtainable only through short-headway operation.

### SAFETY CAR DEVICES CO.

Main Office—Boatmen's Bank Bldg., ST. LOUIS, MO.

CHICAGO  
Railway Exchange Bldg.

NEW YORK  
City Invest. Building

PITTSBURGH  
Westinghouse Building

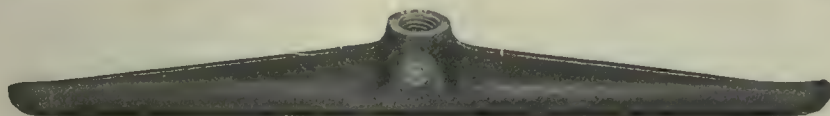
CANADA—Canadian Westinghouse Co., Ltd., Hamilton, Ont.





# PRODUCTS

*Quality First*



O-B Type A Trolley Ear

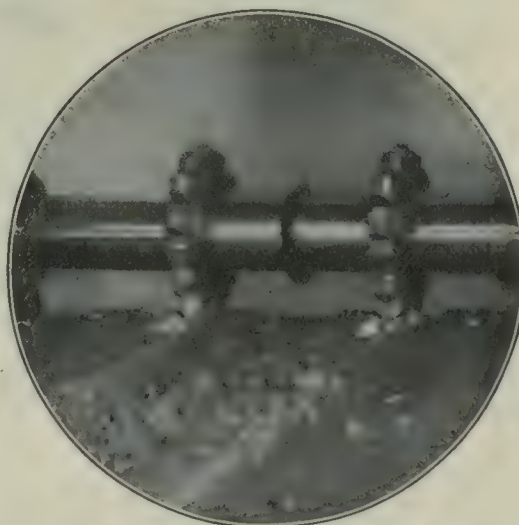
## O-B TROLLEY EARS LIPS RIGHT—METAL RIGHT—LONG LIFE

Lips are the business part of an ear.

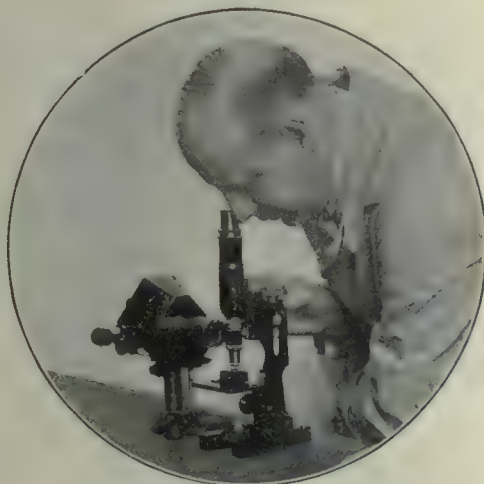
O-B Ears are cast solid and the groove milled out. Only in this way can the metal in the lips always be of good quality.

Milling the groove produces lips of uniform thickness which is impossible with cored grooves, because the core shifts.

O-B Ears have lips of maximum thickness and yet the underrun is smooth, every time.



*Ears are automatically centered on this machine, which mills the grooves.*



*Scientific supervision of processes keeps O-B Bronze at the highest standard.*

The formula adopted by the A.E.R.A. is used and *followed exactly*.

Good metal and the solid casting method which retains the full value of the metal coupled with *right* design puts exceptionally long life in every O-B Ear.

## THE OHIO BRASS COMPANY, Mansfield, Ohio

New York

Philadelphia

Pittsburgh

Chicago

Los Angeles

San Francisco



Elreco Tubular Poles combine lowest cost, lightest weight, least maintenance, greatest adaptability.

# The ELRECO Tubular Pole

is the most  
adaptable for  
joint Railway  
and  
Lighting Use

FOR many years the American Electric Railway Association, the National Electric Light Association and others have endeavored to work out a joint pole arrangement for carrying utility wires in the Streets.

Such joint agreements are very desirable, not only for reasons of economy but also because towns and cities find the number of poles necessary for individual utility service objectionable.

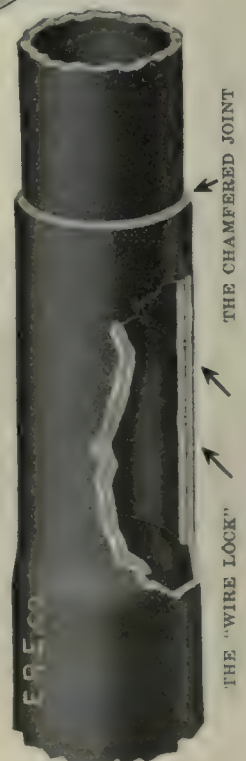
In the Elreco Tubular Pole we have a pole that lends itself most readily to combination railway and lighting services.

Elreco Tubular Poles may be equipped with ornamental bases, lamp brackets or other fixtures designed to harmonize with the local decorative schemes.

Such ornamental and service additions can be made at any time before or after the pole is set. An example: Pittsburg, Pa., equipped 400 standard street railway poles with brackets for ornamental street lighting. This practice is becoming universal.

The versatility of the Elreco Tubular Pole is not shared by any other form of steel pole.

This fact is worth your consideration when you place your next pole order.



Observe the WIRE LOCK

## Electric Railway Equipment Co.

Cincinnati, Ohio

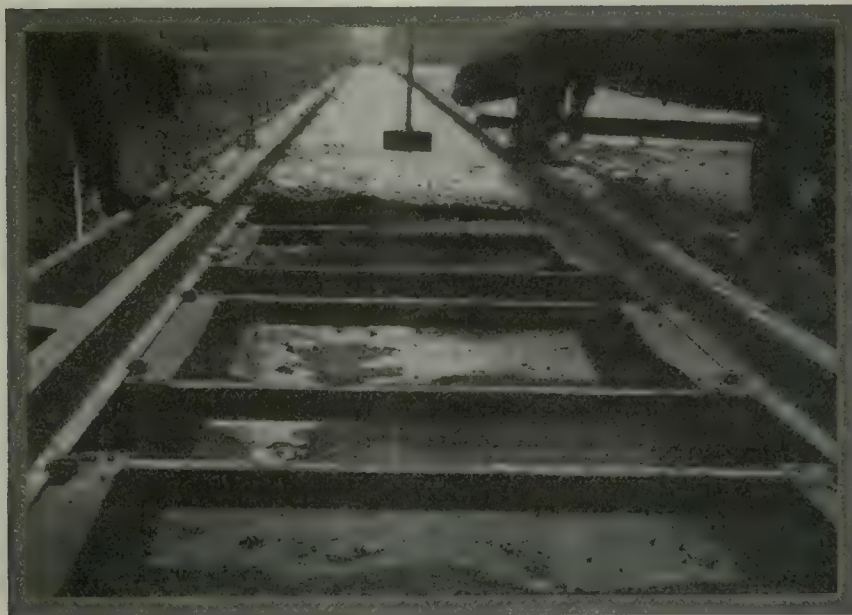
New York: 30 Church Street



# INTERNATIONAL

## STEEL TWIN TIES

Give a Better Rail Foundation with Less  
Excavation and Material



How much concrete do you plan to use beneath the base of the rail?

Twelve inches? Fourteen inches? Or seven inches?

International Steel Twin Tie construction makes it possible to use only seven inches.

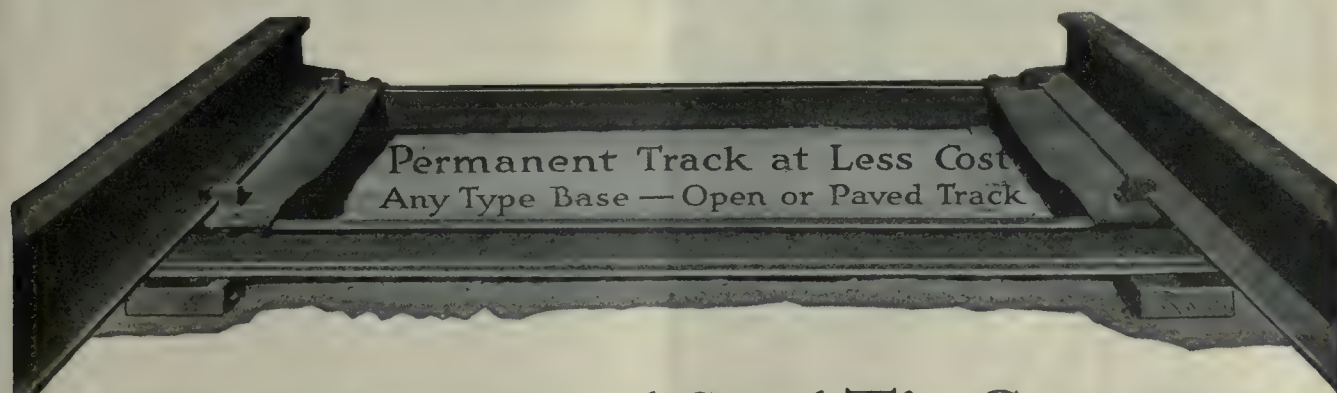
Contrast this with the 12 to 14 inches needed by wooden ties.

Contrast the difference in trench dimensions. Wood ties, trench 8 to 9 ft. wide. Steel Twin Ties—7 ft.

Less labor—less material—less time—less COST with Steel Twin Ties.

And a better track foundation—because, in spite of the fact that you use only 7 inches of concrete, the steel used so reinforces it that it is rendered 100 per cent. substantial, loads are evenly distributed by the plates, and yet a resiliency remains that reduces wear all around. Steel Twin Ties are constructed of two 13 x 36 x  $\frac{5}{16}$ -inch plates, tied together by 3-in. channels.

*Ask us for details of all the economies secured by using these ties.*



# The International Steel Tie Company

Manufacturers of Steel Twin Ties and Crossing Foundations  
General Sales Office and Works: Cleveland, Ohio



# ARMCO IRON WELDING RODS



The trade mark ARMCO carries the assurance that iron bearing that mark is manufactured by the American Rolling Mill Company with the skill, intelligence and fidelity associated with its products, and hence can be depended upon to possess in the highest degree the merit claimed for it.

**T**HE old theory that successful welding necessitates a choice of one from many compositions of welding rods was based upon the assumption that welding rods should have exactly the same composition as the material to be welded.

Experience has shown this to be wrong. Seldom is it possible or practical to determine the exact composition of the material to be welded, and even if it were, the melting of the rod and metal in the presence of surface impurities, gases from the torch, etc., so alters the original filler composition that its *true* welding value is *not* the theoretical.

The chemists, metallurgists and research engineers of the American Rolling Mill Co., and the Page Steel and Wire Co., spent years of profound study and experiment in determining the exact conditions existing and the transformations taking place. Their results and actual commercial experience in welding have proven that one composition of rod in *two tempers*, one for oxy-acetylene and another for electric welding, meets every requirement.

The advantage of using Armco Iron Welding Rods of a single composition in two tempers—is obvious. A shop doing general welding work, instead of having to carry stocks of many compositions, can meet all requirements from a small stock of Armco Iron Rods that takes up small space and involves only a small investment.

Give Armco Iron Welding Rods at least a trial, and you will be pleased with the first cost, ease of manipulation and reliability of the finished work.

Ask for our book  
"Armco Welding Rods"



Steel mill ladles welded with Armco Iron Welding Rods

## PAGE STEEL & WIRE CO.

Established 1883 as Page Woven Wire Fence Co.

Makers of "Copperweld" Copper Clad Steel Wire; ARMCO Iron Welding Rods and Electrical Wire; Wire Mill Products, Plain and Galvanized; Wire of Special Analysis; Wire Fencing for all Purposes; Factory Gates; Ornamental Iron Fence; Machine Guards; Tool and Stockroom Partitions; Architectural Iron.

Plants: Monessen, Pa. and Adrian, Mich.

Sales Offices: 30 Church Street, New York

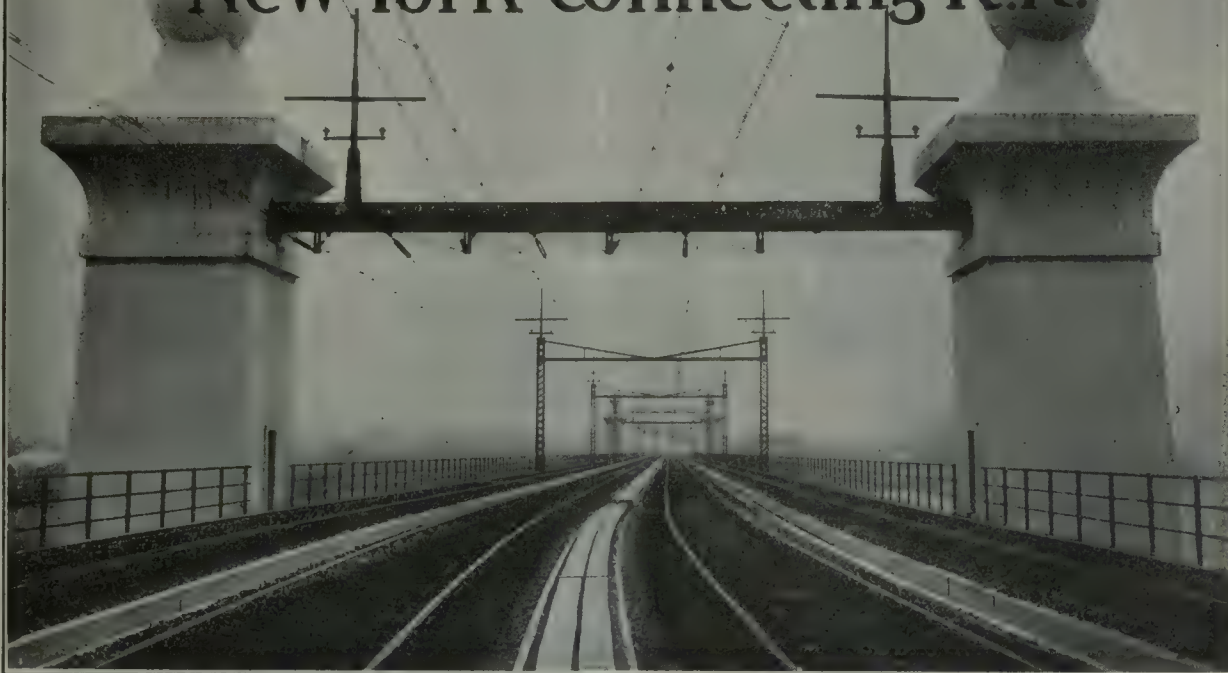
Western Representatives: Steel Sales Corporation, Chicago





# ROEBLING

Messenger Trolley  
and  
Signal Transmission Wires  
on the  
New York Connecting R.R.



## John A. Roebling's Sons Company

Trenton, New Jersey

Agencies and Branches: New York, Boston, Chicago, Philadelphia, Pittsburgh  
Cleveland, Atlanta, San Francisco, Los Angeles, Seattle, Portland, Ore.



# *Minimize Pull-ins for Wheel Renewals*

Hartman Centering Center Plates are reducing pull-ins on 95 electric railways in the United States and Canada.

They are reducing the wear of wheel flanges—doubling the life of wheels—cutting in half the costs for wheel renewals and grinding.

Hartman center plates are also reducing car nosing and they decrease power consumption on curves by 17%. They are actually accomplishing these results and 72% repeat orders on our books show the satisfaction these bearings are giving.

## Holden & White Inc.

Electric Railway Distributors for The Joliet Railway Supply Company

817 Fisher Bldg., Chicago

National Rwy. Appliance Co., New York, Washington; W. M. McClintock, St. Paul; Alfred Connor, Denver; C. E. A. Carr, Toronto; F. F. Bodler, San Francisco; S. I. Wallis, Los Angeles; W. F. McKenney, Portland; L. Brandenburger, Salt Lake City.

### Put Them On Your Old Cars

Hartman Center Bearings can be easily placed on old cars as well as new. Send for descriptive catalogue and dimension sheets. Try a few sets.



# Hartman Centering Center Plate





# Phono-Electric

Twice the Wear, But Not Twice the Price

That is the simple arithmetic of Phono-Electric superiority.

When copper was 14 cents a pound the proportionate extra cost of Phono-Electric was a good bit more than it is today.

Yet many electric railways bought it and continue to buy it.

With copper now at a higher figure, the wire-life insurance charge for Phono-Electric is a better bargain than ever.

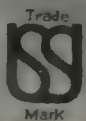
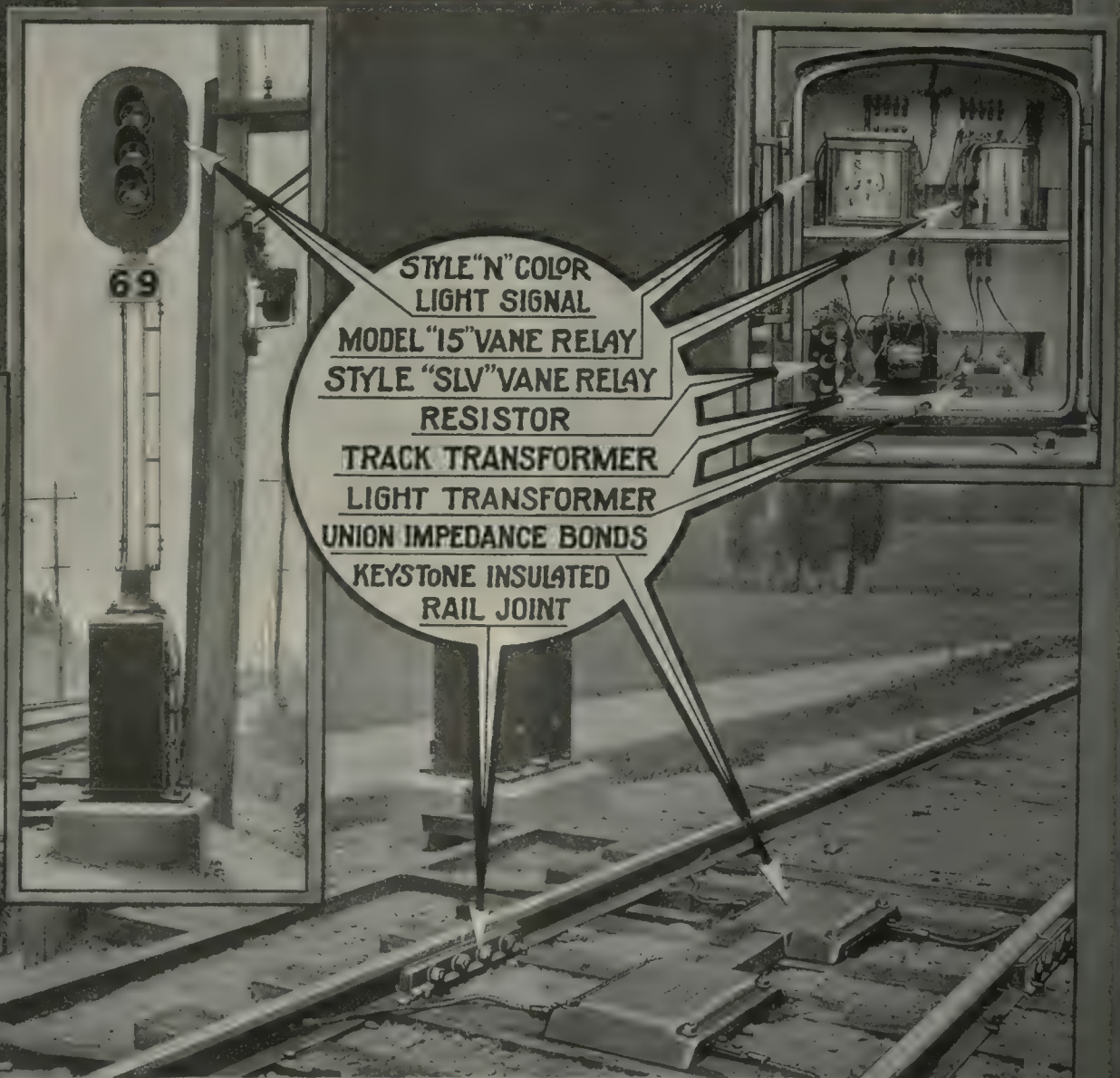
When you buy Phono-Electric you cut your worries about wire price fluctuations in half at least.

**Bridgeport Brass Company**  
**Bridgeport** **Connecticut**



# STYLE "N" COLOR LIGHT SIGNALS

UNION equipment will solve *your* interurban traffic problems. Let us study your operating conditions and cooperate with you in considering what *automatic block signaling* will do for *your* line.



Trade  
Mark

## Union Switch & Signal Co.

SWISSVALE, PA.



Trade  
Mark



# Observe the figures on the face of this meter

Is there anything complicated about them? As a matter of fact, aren't they as simple as the figures on a clock—if not simpler? That's all the motorman has to read when the

## ECONOMY METER

*"The Watchdog of Your Power"*

is used as an energy-checking and saving device on his car.

Simple? So simple that a school boy could take the reading.

Neither theorizing nor attacking argument will prove a point—only the underlying facts are conclusive. If any railway man is interested in installing an energy-saving device on his road, he will most certainly want to investigate the notable superiority of the ECONOMY METER for this service.

The ECONOMY Meter has no paper



tape rolls to keep filled; no ink supply to maintain; no clock mechanism to rewind, oil and adjust; no fuses to blow and be replaced; no relays to stick or to burn out; no pneumatic plungers to be kept in such condition that they will function uniformly; in fact, it has no parts that are ever differently affected by wet, dry, hot or cold weather conditions, water or scale in the brake system. Maintenance work on Economy meters can be done as a bench job—no need to hold cars out of service while making repairs.

*Meter the Energy—That's What You Want to Save*

## Economy Electric Devices Company

L. E. Gould, President

*Exclusive Sales Agent Sangamo Economy Railway Meter*  
Old Colony Building, Chicago

New York Office: 50 Church St.

Wetmore-Savage Co.  
Boston, Mass.

Burton E. Stare Co.  
Seattle, Wash.

Ludwig Hummel & Co.  
Pittsburgh, Pa.

Rumsey Electric Co.  
Philadelphia, Pa.

L. A. Nott  
San Francisco, Calif.

J. G. Monahan  
Los Angeles, Calif.





# Low Cost to Install No Cost to Maintain DAYTON Mechanical Ties

Briefly, the ties are attached to the rails—rails blocked to level—and concrete poured exactly as in ordinary paving. Untreated wooden ties, completely installed, including labor charges, with gravel ballast, cost 6% more than Dayton Mechanical Ties for the same length of track. At the end of ten years they cost more than double your Dayton Ties!

Dayton Mechanical Ties form a rigid, reinforced concrete bed. **Yet each tie rests on its own highly resilient cushion** of asphalt under the wooden-block rail support. A special form of tie insures against low and uneven joints.

*Better economy dictates your inquiry to us today.*



*Order One for Trial and Be Convinced*

**THE DAYTON MECHANICAL TIE CO.**

201 Third Street Arcade  
DAYTON, OHIO





# White Trucks



## NORTHERN TEXAS TRACTION COMPANY OPERATES NINE WHITE TRUCKS

**T**HIS White tower truck is one of nine Whites operated by the Northern Texas Traction Company in construction, maintenance and passenger service. During the two years it has been in operation the tower truck has handled all feeder work on the Fort Worth lines.

In service of this kind—largely made up of emergency runs—the ability of a truck to get to a job with certainty and on time is of utmost importance. The absolute dependability of the White Truck accounts for its wide use in electric railway service.



THE WHITE COMPANY  
CLEVELAND

*Largest Manufacturers of Commercial Motor Vehicles in America*



# Stop your splice bar fractures

by avoiding the wear  
that makes them  
start!

You do this  
by equipping with

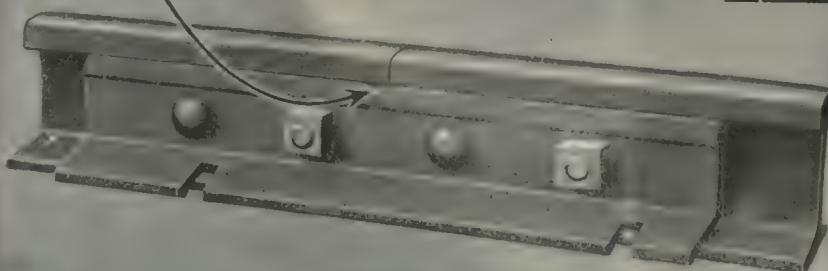
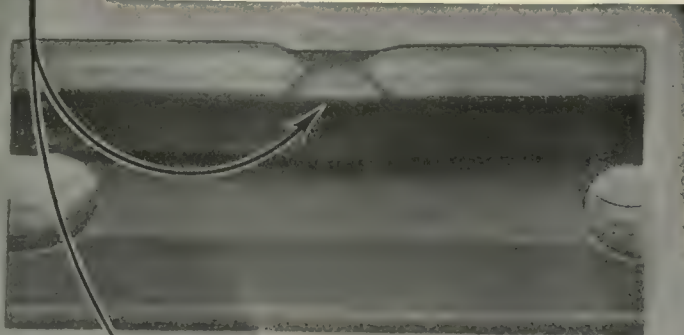
## Lackawanna Safety-Head Angle Bars

Angle bar fractures originate mainly in wear and cutting at the top, the break then apparently developing from the back action or upward thrust of the rail ends.

The Lackawanna Safety Head Angle Bar overcomes the liability to break by eliminating the initial causes. This is accomplished by depressing the metal in the head of the angle bar for a short space at the center where the rail ends meet, so that the bar will not be cut or worn by the action of the sharp under corners of the rail heads at the ends. The metal in the angle bar therefore retains its original skin and finish without destruction or upsetting under the pounding of the wheels at the joints, and in this condition is able to resist the severe strain due to the upward thrust of the rail ends caused by the passing loads.

A trial of Safety Head Angle Bars where the ordinary kind have given most trouble will soon prove our construction capable of big savings and greater safety. Write for further information.

Ask for Our Booklet  
"Improved Track Appliances" 291



## Lackawanna Steel Company

LACKAWANNA, N. Y.

ATLANTA  
BOSTON  
BUFFALO

CHICAGO  
CINCINNATI  
CLEVELAND

DETROIT  
NEW YORK  
PHILADELPHIA

ST. LOUIS  
SAN FRANCISCO  
HAVANA



This Model weighs 85 pounds and will operate on 250 to 750 volts with a current regulation of from 60 to 200 amperes in steps of about 15 amperes.



## Don't Discard Those Parts

—those old armature shafts, axes, gear casings, flat wheels and many more parts rusting in your scrap pile. Save them by building them up with an ERICO Arc Welding Rheostat.

Erico Arc Welding Rheostats can be operated direct from your trolley wire current.

We also make standard equipment for 110 and 220 volts, and can supply special equipment for any other voltage or current capacity.

Reduce that scrap pile.

**The Electric Railway  
Improvement Co.**  
Cleveland, Ohio







1. Applying Molasses to Asbestos Strips for Luting between Edge of Mold and Rails.



2. Applying Asbestos and Molasses Strips to Rails previous to Adjusting Mold.



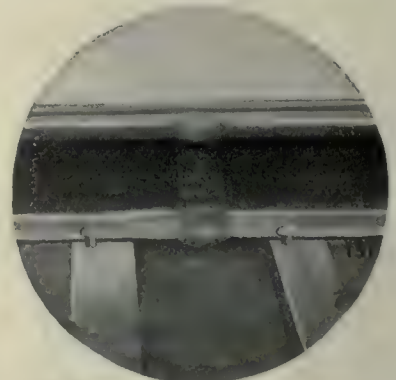
3. Adjusting Two-Part Mold to Rails.



4. Mold and Crucible Compound in position ready for preheating—box containing Thermit additions.



5. Preheating Rail Ends. Heating Thermit additions and baking mold in one operation.



6. Finished Thermit fully welded. Insert Rail Joint.

# What is the difference between a welded rail joint and a **THERMIT Weld?**

In a merely *welded* joint, the fissure between the rails is only *partly* obliterated. The joint is still weaker than the rail itself. The return circuit is retarded.

In a THERMIT Weld the rail joint ceases to exist. *It is obliterated.* The union of rails is 100% efficient, both mechanically and electrically. The resistance to the return circuit is reduced. Electrolytic damages are prevented. Years are added to the life of the track. And the cost is lowest in the end.

*Allow us to send Catalog 1232—or to send a representative to discuss the matter more fully.*

**Metal & Thermit Corporation**  
120 Broadway, New York

*Successors to*

**Goldschmidt Thermit Co., Goldschmidt Detinning Co.**

Branch Offices and Shops: 1427 Western Ave., Pittsburgh, Pa. 7300 So. Chicago Ave., Chicago. 329 Folsom St., San Francisco. 15 Emily St., Toronto, Ont.  
Factories: Chrome, N. J. Wyandotte, Mich. East Chicago, Ind. Jersey City, N. J.





Electric railway operation in war-time has furnished an impressive exhibition of the way in which deterioration in one part of the equipment reacts on other parts. Bad track and special work are the cause of motor and truck troubles. Defective wheels, in turn, wear out the track. Poor power supply overloads motors, and thus run-down power-plant generators, turbines, boilers, etc., not only eat into the heart of the coal pile by operating at low capacity, but affect the useful life of the car motive apparatus.

BEFORE

Read the above excerpt from  
an Editorial in this Journal, 11/16/18

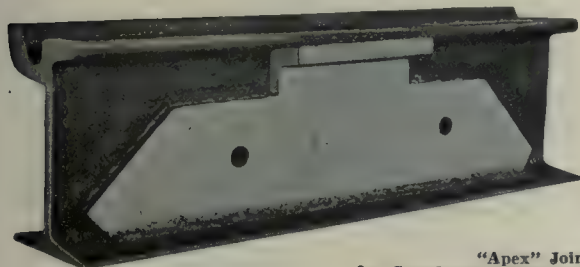
AFTER

## The Indianapolis Welder prevents the cumulative effect of worn rails—

The Indianapolis Welder will build up the weak spots in old rails, making cupped rails, broken frogs, switches, cross-overs, joint plates, etc., good as when new.

Any man with ordinary intelligence can do the work with the Indianapolis Portable Electric Welder. Unskilled help can fix broken, worn or gutted track, damaged switch tongues, frogs and switches and *broken and worn parts* of equipment.

The Indianapolis Portable Electric Welder makes electrically welded rail joints instead of bolted joints. Indianapolis Joints and Bonding Plates show greater conductivity than the rail itself. They eliminate current losses.



"Apex" Joint  
for Guard and Girder Rail

**Indianapolis  
Switch & Frog Co.  
Springfield, Ohio**





## Consolidated Thermostats Keep the Temperature the Same

Consolidated Thermostats relieve you of all dependence on human fallibility. They keep the car at the predetermined temperature, taking full advantage of the sunshine hours. They save 33 to 66 per cent. of the heat usually wasted by ordinary means of temperature control.

When the rush-hour comes, with its demand for more tractive power, substantial relief is afforded by the automatic decrease of the heater requirements due to the larger number of people on the car.

It is sound business to equip all your cars with Consolidated Thermostats.

**CONSOLIDATED CAR-HEATING COMPANY**  
ALBANY NEW YORK CHICAGO

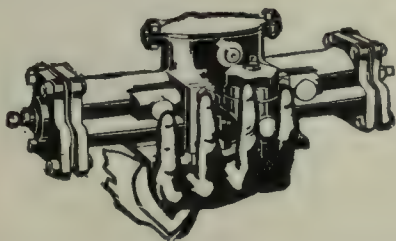




# Use National Pneumatic Door and Step Control

*To Convert Your Open or Gate Cars to the Standard Vestibuled Type*

Applied to your present open bench cars, you eliminate running-board accidents. Applied to your present gate cars, you eliminate platform accidents.



Applied to any kind of car, you eliminate the need for the manual labor so scarce and expensive today.

Prices and delivery dates are yours for the asking.

## NATIONAL PNEUMATIC COMPANY

INC.

50 Church St. New York



515 Laflin St. Chicago





Black and Yellow Varnished  
Cambric

Oiled Silks and Papers

Flexible Varnished Tubing

Cellulak Tubing

Cellulak Plates

**IRVINGTON VARNISH & INSULATOR CO.**  
**Irvington, New Jersey.**

---



# Complete Protection *for* SNAP SWITCHES



Type GSC Condulet

"Here's another new Condulet — Type GSC. It's a dandy and lets me use a snap switch on this outdoor installation.

"No dust or moisture can get inside the Condulet and the thumb knob can't be broken off. The indicating feature is preserved, too."

Type GSC is only one of a complete series of protective Condulets for snap switches. They are especially suited to out-of-door, marine, garage, refinery, and textile and flour mill installations.

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You will find it valuable*



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Differences in height of rails at joints must be removed immediately to conserve the life of the joint. Practice has demonstrated this very forcibly within the last eight years, and I will mention one particular instance out of many where the issue was brought to my attention. Two pairs of compromise splices were installed of the Atlas type where 70-lb. A. S. C. E. rails were connected to 97-lb. 424 grooved section. At the time of installation in 1913 a very slight difference in the surface of the rails was noticed, and we neglected to grind the rails to a smooth surface. This was a single track over which 26-ton cars operated on from a headway of from three to four minutes. *Inside of eight months these joints were a wreck, including paving and rail ends.* In order to repair them, new Atlas plates were installed, new pieces of rails were cut in, *and the joints were then ground to a true surface.* After more than two years these joints are apparently as perfect as on the day they were installed. We find this to be particularly true on compromise joints at special work.

*From a report of the track superintendent of a large electric railway*

## The Proven Case

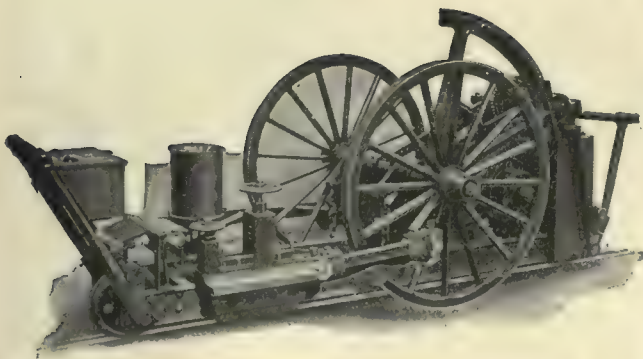
# The Reciprocating Track Grinder

has *proven* its value to the electric railway industry.

That proof has been given in such cases as the one cited above. It has been given in cases where stretches of track were in such bad condition from corrugations and cupped joints that replacement seemed the only remedy and the Reciprocating Grinder restored the rail to useful service. It has been given in cases where other types of machines had been tried and found unsatisfactory.

And this proof has been given just as it is given today—by the actual performance of the machine in service—by putting the machine on the track and letting its work furnish the evidence of its value.

We will gladly put a Reciprocating Grinder on your track to prove its worth to you, without any risk on your part.

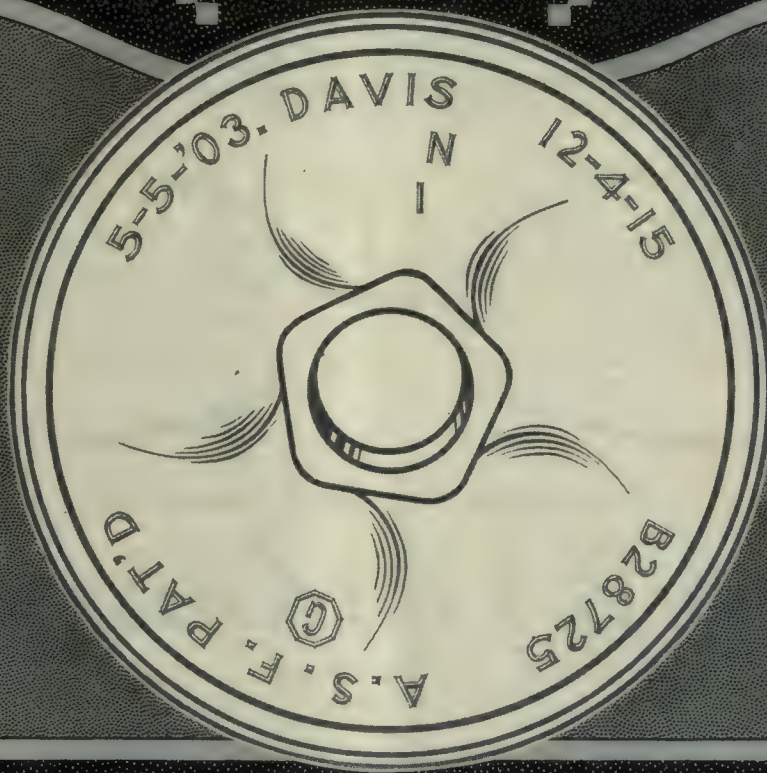


## RAILWAY TRACK-WORK COMPANY

30th and Walnut Streets, Philadelphia



# DAVIS STEEL WHEEL



Steep grades with the resulting frequent brake applications do not lessen the service of the Davis Wheel.

## AMERICAN STEEL FOUNDRIES

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*The Front Entrance  
Means greater Conservation  
of your Passengers and  
Your Own Time*

*The H. B. Guard Means  
more complete & efficient  
protection of your Passen-  
gers' Lives*

Because this car has the  
**H-B Life Guard**

It renders PERFECT service. When passengers wish to enter or leave these Birney cars in Tacoma, Wash., they "step to the front."

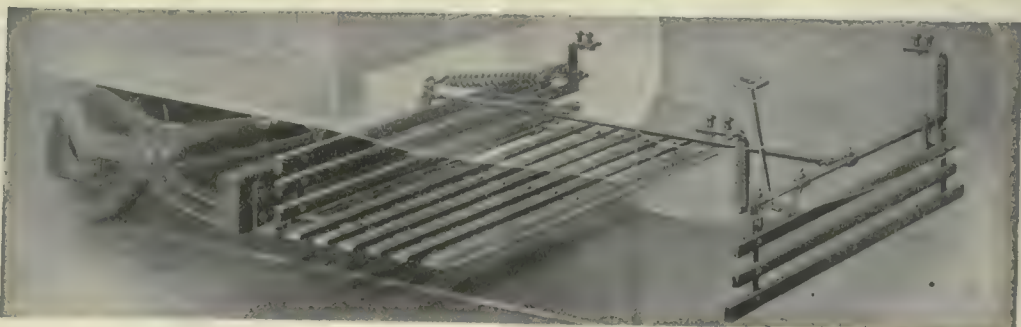
Crowding towards the "business end" of any trolley car calls for the maximum protection at the business end.

By installing H-B Life Guards Tacoma has

gained insurance against the fatal results of accidents due to *carelessness of passengers*. The Birney Car idea provides amply for the *motor-man's* efficiency. The two together—car and H-B Guard—form the most *complete protection* possible against fatalities. With H-B Life Guards bodies cannot come in contact with car wheels. H-B Guards are the last word in Safety Guards!

**THE CONSOLIDATED CAR FENDER COMPANY**  
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General Sales Agent **WENDELL & MACDUFFIE CO.** 61 Broadway, N. Y.







## The Center of Traffic in Oil, Coal and Steel

The development of adequate railway service changed the whole direction of Pittsburgh's commerce.

In 1846, at the time the picture was made from which the above illustration is reproduced, Pittsburgh commerce was largely water borne.

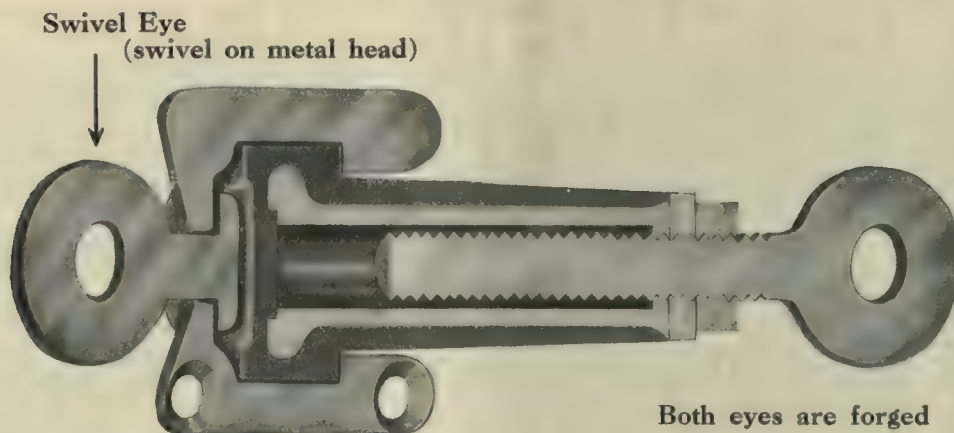
With the development of railway facilities Pittsburgh found, of course, tremendous increase of opportunities for the outlet of its products East and North.

Today in population alone Pittsburgh is more than thirteen times as large as it was at the time of this picture and the growth in the increase of its commerce may be judged from the fact that its total annual output was valued in 1846 at the handsome sum of seven millions of dollars!

Internal as well as external railway development has aided Pittsburgh's mighty growth. The Pittsburgh Railways Co. alone operates 605 miles of electric railway track for the intramural service of the population. And in both the internal and external railway activity an important and helpful part has been played by

**Galena Oils  
and  
Galena Service  
Galena-Signal Oil Co.  
Franklin, Pa.**





## The Brooklyn Strain Insulator

(An Insulated Turnbuckle That Will LAST)

The sherardized malleable iron head of this insulator is made in two halves fitting around the head of the insulated portion and riveted together. This construction affords a resistance to tensile strain equal to the breaking point of the solid metal. The swivel eye gives a metal to metal bearing and both eyes are of sherardized drop-forged steel.

G-E electric oven sherardizing permits readjustment of the device after years of service. *The threads will not rust.*

*You can get prompt shipment from stock.*

**General**  **Electric**  
General Office **Company** Schenectady, N.Y.



# Electric Railway Journal

Consolidation of STREET RAILWAY JOURNAL and ELECTRIC RAILWAY REVIEW

Volume 53

New York, Saturday, March 1, 1919

Number 9

*The Program of the Mid-Year Meeting Will Be Found on Page 412 of This Issue*

## Standardizing the Various Committees on Standards

THE standardization work of the American Electric Railway Association should be benefited by the organization of the American Engineering Standards Committee (which will probably become known as the A. E. S. Committee), to which Comfort A. Adams gave considerable space in his A. I. E. E. presidential address last week. The scope and plan of this committee are covered in an article elsewhere in this issue. The formation of this committee is in line with what is being done in other countries, and the work of the committee will be a success from the start if the co-operation of all interested societies is enlisted at once. An enormous amount of time and energy has been put into the department of specifications of one sort and another in the hope that these would prove useful in reducing costs, and undoubtedly the total results secured have been very great. That they have not been as great as hoped or expected is illustrated by the experience of the American Electric Railway Engineering Association, which is typical.

One trouble in all of this work, as pointed out by Professor Adams, is "that in many cases the committees are made up of men who do not realize that a standard must not only be rational and technically correct but it must also be acceptable to all those interested in its manufacture and use." In the case of the railway association it has not been so much a matter of the personnel of the committees as a failure on the part of the industry to realize in a practical way what can be accomplished from reasonable uniformity in design. There has not, of course, been the urgent necessity for standardization in electric railway work as in some other lines. For example, the steam roads simply had to get together on couplers and other car details on account of the interchange of freight cars. The automobile manufacturers had to do something of the same kind to enable repairmen to maintain cars of all makes with a reasonable stock of supplies. In the electric railway field the benefits seem more remote and therefore less tangible.

To return to the quotation given above, let us consider further the expression, "a standard . . . must also be acceptable to all those interested." Now the proof of acceptability is use, not mental assent to theoretical value. A "standard" is a standard only when things are made to standard specification. It would be as idle to expect a musical or literary composition to be

a "classic" by so labeling it as to expect a specification to become standard by the same process. A standard must be a crystallization of existing tendencies in practice if it is to live and serve its purpose. To paraphrase an old conundrum: "When is a standard not a standard?"—Answer: When nobody uses it.

## Painting Economies Are Increasing

THERE are very few railways that have been able to increase the number of their cars in proportion to the increase in passenger traffic that has occurred during the past two years. This has caused an increased demand by the transportation department that all cars possible be made available for rush-hour service. The mechanical department has thus been placed at a decided disadvantage in carrying out its car-painting schedule, as it is difficult to get the equipment into the shops and when once started all work must be hurried so as to get the cars back into service again at the earliest possible moment. Proper protection of all cars, and especially of steel cars by painting, is very important. Several roads have simplified their painting considerably by eliminating striping and lettering; simple monograms have been substituted for the long names of railways, and numbers have been omitted from the body of the car in many instances. The use of house paint of a uniform color which does not show dirt readily is being adopted at least to some extent. Several roads have adopted battleship gray for their cars and effected considerable savings. Oil enamel has come into general use instead of the older methods of applying a primer with several coats of lead to be followed by rubbing coats and finishing varnish.

The spraying system of painting has also been adopted by several roads. This permits of the work being done in a much shorter time, and many places inaccessible to a brush are thus reached. The amount of paint used with the spraying system is undoubtedly greater than if cars are painted by hand, but this slightly increased cost will be more than paid by the revenue resulting from the earlier return to service.

The removal of paint from cars is another item on which time can be saved by careful selection of equipment and the use of approved methods. In Omaha by using a type of torch for burning off paint with a single hose line instead of with hand torches previously used, the time taken for this part of the work was reduced 40 per cent. Old methods of painting cars are



being rapidly superseded by more rapid and simpler practices. The long standing tradition that electric railway cars must be painted and varnished much like a piano is not in harmony with the present times of efficiency and economy.

### Safety Cars Making Good in Connecticut

EVIDENCE continues to accumulate that the safety cars put in operation in Bridgeport on Feb. 2 are most popular with the public, the men and the company. As described in our issue of Feb. 15, the line on which they run is not in the outskirts but extends through the center of the city where the streets, as in many other cities in New England, are quite narrow. Nevertheless the cars maintain their schedule and make such good time that they are winning traffic from those who formerly walked or rode in private automobiles. The Hartford press is already calling for their installation, at least experimentally, in that city, to which one of the Bridgeport papers replies: "All the Birney cars that Hartford does not want, Bridgeport will take." The success of the light car was presaged by experience in the Southwest, but satisfaction over the first extended trial in New England is none the less welcome.

Of course the demonstrated value of the safety car for certain routes should not tempt managers to apply it to conditions to which it is not adapted. On heavy traffic lines in large cities two men per car are still recognized as necessary by the advocates of the safety car. Nor should the car be considered as in any way removing the necessity for a higher fare than that which was adequate before the war conditions raised the prices of material and labor. The car helps a railway to give improved passenger service on a route for which it is adapted, but it should not be expected to effect miracles in the financial condition of the operating company. In this connection it might be said that the Connecticut experiment has demonstrated that the motorman on a safety car has no difficulty in collecting a 6-cent fare. The fact that it consists of two coins has not materially affected the speed of the safety cars.

### Complaint Handling Makes Friends or Enemies—Which Do You Want?

THE Illinois Public Service Commission, as a result of its five years' experience, has been much impressed with the influence of complaint handling upon public relations. As we noted in a recent issue, the commission has directed the attention of the State utilities to this point. Its action in so doing is to be commended, not because utilities in Illinois need the reminder any more than those in other states, but because the commissions should be encouraged to make use of their function of double representation to bring the public and the railways into a better understanding.

The specific suggestion of the Illinois commission cannot be urged too strongly. Complaints in most cases are the beginning of an intercourse which will result in the making of friends or enemies. The choice in the main lies with the company. A prompt, sympathetic acknowledgment, followed by a just investigation and a prompt, frank explanation, will probably satisfy the complainant and convince him of the company's

sincerity and honest efforts to serve. But what does the other course do?

Three years ago a friend of ours sent in a legitimate complaint regarding poor service and discourteous treatment by employees on an Eastern railway. Two weeks later he received a stereotyped reply to the effect that the complaint had been referred to the official who had "special charge" of such relations with the public. Since then—silence, in spite of a repetition of the complaint. Perhaps the case has not yet been reached on the company's complaint docket; be that as it may, an enemy has been made. Need we add that this company to-day is in general public disfavor? Need we say that a large part of this ill-will is undoubtedly due to such examples of complaint-handling stupidity?

But it may be argued that the company is not at fault for what this "public relations" official failed to do. It is true that an executive and a board of directors cannot keep in touch with the details of such work, but the vital character of all relationships with the public permits no excuse for a lack of general supervision by those in authority. Certainly when public hostility is growing yearly and no effort is made to lessen it, the blame lies at the door of the highest.

### Public Misconceptions Cannot Simply Be Wished Away

ELECTRIC railways are widely distrusted by the public. This may be stating conditions with excessive harshness, but not to any great extent. Observant operators have during the last two years noticed on the part of the public an attitude of decided hostility which has hindered if not prevented the procuring of many higher fares. About 348 fare increases have indeed been granted, but many petitions have been refused and many others have been allowed only after much delay and strife. Why is this?

This question permits of various answers, according to the class and the experience of each respondent. Some striking answers are given in the address made by R. T. Sullivan before the Central Electric Railway Association, abstracted this week, and more are contained in the replies, published this week and last, to the questionnaire which this journal recently sent out to public service commissioners, mayors, representatives of chambers of commerce and other men interested in civic affairs. The answers are not sufficiently numerous to warrant the drafting of very definite conclusions, but on the whole they seem to be centered around a few general ideas worthy of mention.

To take Mr. Sullivan's remarks first, he frankly says that electric railways have shown the lack of a definite and a continuous policy in the past; that their publicity has too often consisted of cries for succor in emergencies rather than of a constant telling of all the facts in times of calm as well as storm, and that some deeds of the past are not to be commended. He avers, however, that frequently railway men are too ready to take the blame for sins of bygone days; that political attacks and yellow journalism have created and fostered public ill-will against the railways, and that the car rider's interest in service is purely selfish while the railway desires the good of the largest number.

While admitting that the electric railway industry



has internal faults, therefore, Mr. Sullivan points out emphatically some external causes of public distrust. He undoubtedly speaks the truth, but—here's the vital point—the public is less interested in its own faults than in the believed faults of the railways. The thinking part of the public will confess the injustice and the impropriety of certain methods of handling utilities, but the public as a whole lays the greatest blame for present conditions upon internal defects of the electric railway industry.

Do you think that this is exaggeration? Read the replies to our questionnaire. The points which public representatives believe the public has in the front of its mind are these—that many railways are over-capitalized; that they held on to the 5-cent fare to make excessive profits in the past and can well stand temporary losses now, and that they have in the past rendered some form of inadequate and inefficient service. Therefore the public's idea of correction is more of a punitive character than that of assisting the railways to get on their feet again. In most concrete cases the charges are based only upon erroneous ideas and deep-seated prejudice, as many public leaders admit behind the scenes. But the public believes the charges to be true, and it requires more than a mere denial of them on the part of the railways to convince the public that retributory treatment is not justified.

The public has a certain fundamental antipathy against doing any more than it must to aid any monopoly, but its hostility to electric railways goes beyond this. If we had to sum up in two words the reasons for this general hostility, as portrayed by the replies to our questionnaire, we would unhesitatingly choose "ignorance" and "distrust." And what do the public representatives suggest as the proper means for overcoming these states of the public mind? Facts, and a conduct that creates and maintains confidence. Note carefully this double answer, for it is characteristic of the public point of view. Publicity is deemed to be fully effective only when it is backed up by the rendition of adequate service and the maintenance of a genuine policy of public co-operation.

The public must be educated, to be sure, but it has its own ideas about the process. It wants to be able to find out the facts instead of being deluged with mere argument. It wants its education to be through a consistent 365-day policy of facts supported by performance and not through a sudden splurge of publicity only when the company is in difficulty. It wants to know what the service costs and where the money goes. It wants to know the reasons, if adequate service cannot be given. It wants a surfeit of information and evidences of a desire to serve and to please. That is the price of public good will.

One word more. As Mr. Sullivan says, unfortunate is the company which cannot see its way clear to a consistent policy of publicity until it finds itself in a tight place. The last two years has produced many such unfortunates. Have they fully learned their lesson? We hope so, for doubly unfortunate would be such a company if it should now give up its work for better public relations. There is only one thing worse than a public neglected, and that is a public used and abandoned.

### A Decision in Which Both Sides Lose

THE people of Des Moines appear to have won a hollow victory in the decision of Federal Judge Wade denying an increased rate of fare and holding that service must be adjusted to the income of the electric railway property. The decision was referred to in our issue of Feb. 15, and while it is a complete indorsement of the sanctity of a franchise agreement it also makes clear that a contract works both ways.

The court's ruling interprets two sections of the ordinance of 1915 under which the receivers for the company hoped to be released from the established fare of 5 cents or six tickets for a quarter. The receivers claimed that the service demanded by the city could not be rendered under present conditions from the present income. The federal judge held that while this claim if true is most unfortunate, he had no authority to modify the provisions of the contract. This meant, he explained, that the people are bound by the agreement as well as the company, "and when they get that service which can be paid for under the provisions of the contract, they must be content." Announcement of the court's views was followed by a statement of the company officials that a general curtailment of service would go into effect in the near future.

A regrettable feature of the Des Moines situation is that this modern type of ordinance, containing many excellent features, the result of a long period of negotiations, should so soon fall short of the purpose contemplated by its framers. Its weakness, of course, was the establishment of a flat rate of fare, and now that the court has emphasized the folly of such an arrangement we believe the car riders will be convinced that they have won no real victory in having the contract declared sacred. This view is already taken by the *Des Moines Capital* which says: "The real loser will be the patron, and when the patron loses the merchant naturally suffers his proportion of the loss, which will be exceedingly great. It is a most unfortunate result, after all of the years of effort Des Moines has made to get a real solution of its street railway problem."

Adequate transportation is the life-blood of a community. Excess service is a waste and insufficient service is a detriment. It is the part of good operating policy to eliminate non-productive lines, but when the curtailment of service is necessary on other routes because the patrons are unwilling to pay for what they are getting, the result must be unfortunate for all concerned.

The people who must put up with inferior service will, of course, be subjected to inconvenience, and business interests are bound to suffer in every district where trade is driven away because the facilities for transportation are allowed to deteriorate. We hope the people of Des Moines will not be too long in finding this to be true. Their better judgment must prevail after an experience with inadequate facilities, and if a new and more equitable deal between the company and the city is the outcome the decision of Judge Wade will have proved beneficial to all parties in this unfortunate dispute. We look for a speedy readjustment of the fare controversy.



Handling  
Electric Railway  
Freight  
by  
Train Loads



(In order of appearance)  
Waterloo, Cedar Falls &  
Northern Railway.  
Sand Springs Railway.  
East St. Louis & Belle-  
ville Electric Railway.  
Toledo & Western Railway  
Illinois Traction System.





# Hints for the Freight Operator\*

By A. B. COLE

Westinghouse Electric & Manufacturing Company



HAULING FREIGHT ON THE FORT DODGE, DES MOINES & SOUTHERN RAILROAD

**M**ILK HANDLING is undoubtedly one of the oldest forms of freight service on electric lines, and milk is generally one of the first commodities to be handled by any line taking up freight operation. Almost all electric railways have milk service, and this service is so valuable to the communities served that its loss would be of considerable monetary value. Consider, for example, the milk traffic into Indianapolis. The interurban lines entering this large center transport about two and one-half times as much milk and cream from the surrounding territory as do the steam railroads. During one year an interurban line carried 191,000 cans of milk and cream into the city, while all the steam lines together brought only 186,000 cans. This tremendous traffic is probably due to the frequent movement of electric as compared to steam trains, and also to the accessibility of the electric lines to the farms. The electric lines not only give frequent and fast service but also load milk at cross roads.

One way for an interurban railway to increase its freight revenue, without materially affecting the quantity of freight handled, is to see that all milk rates over the various divisions are consistent. On many lines inconsistencies often exist which involve discrimination and cause the companies to lose considerable money.

To supplement a milk and dairy service, one of the most natural services is that given by market trains.

## Market Train Service Offers Lucrative Field for Electric Railways—How Interchanged Equipment Should Be Cared For—When Motor Cars, Trailers and Electric Locomotives Should Be Used—Proper Signaling Is Necessary for Safe Freight Operation

This applies, of course, to interurban lines that operate in territory having a number of truck and fruit farms. Market-train service has proved lucrative wherever tried on steam railroads, and undoubtedly interurbans, on account of their accessibility to the farms at one end and the city public at the other, could in many instances do a similarly profitable business. In general, however, this market-

train service would not interest growers whose production was sufficiently large to enable them to ship in carload lots. Nor would it be of any advantage to those communities where farmers were co-operatively united to ship in carload shipments the output of many farms devoted to the products of the same commodity.

The service is designed primarily for small producers. Fruits and vegetables on many farms are maturing at intervals throughout the summer. The dairy products (eggs and poultry) and such commodities as apples and potatoes usually can be shipped throughout the year when ready for shipment or as the market demands. In all cases the producers would naturally combine their shipments into carload lots whenever possible.

The market nearest to the small farmer is generally the best for him, especially if he produces a great variety of commodities and does not specialize on one or two. As nearness to the market enables him to keep in close touch with its demands, he can quickly adjust his supply to the demand. The electric railway plays a most important part in making the market accessible to the farmer irrespective of the location of his farm, provided it is within a distance of 100 miles.

In other words, the small farmer is really doing a re-

\*Other articles by Mr. Cole in regard to freight hauling by electric lines were published in the *ELECTRIC RAILWAY JOURNAL* of May 11, 1918; Jan. 4, 1919, and Feb. 1, 1919.





TYPICAL FREIGHT MOTOR CARS IN ELECTRIC RAILWAY SERVICE

New York State Railways.  
Interurban Railway & Terminal Company.  
Waterloo, Cedar Falls & Northern Railway.  
Detroit United Railway.  
Northern Ohio Traction & Light Company.

tail business when compared with the large producer. Since the retail market is adjacent to or near the city terminal of the electric railway, the small producer by using the interurban can do a retail business in every sense of the word and sell direct to the consumer in spite of the distance of his farm from the city.

In some sections of the country electric interurbans have thus performed considerable economic service to the city communities, but often the advantages of market-freight service are offset by the lack of adequate and centrally located city terminals. Sometimes, too, the Board of Health of the city has imposed restrictions, making necessary the shipment of certain commodities in one type of car to the exclusion of all others. This increases the cost of transportation facilities on lines where one car would hold all the shipments. The paramount obstacle, however, seems to be the restrictions imposed by local authorities on the running of freight cars through city streets, but even this can be overcome by proper salesmanship on the part of the traffic manager.

These are merely a few of the objections that are found to exist in connection with instituting a market-train service. Without electric service, however, the small farmer is dependent either upon the local freight train service of the steam railroad, which is too slow, or upon express service, which is relatively too expensive. Therefore there seems to be a possibility for considerable development along the line of electric railway market service.

#### HOW LOCAL SERVICE SHOULD BE HANDLED

The handling of local freight train service is a most important transportation problem. As conditions exist throughout the country, it is the immediate problem that electric railways must solve if they expect ever to meet the freight situation successfully. The steam railroads are passing up the local or short-haul freight and in many instances turning this over to the motor truck.

Adequate passenger service generally supplied by electric railways enables traveling salesmen to make several towns in one day. This always increases the merchandise sales of the jobbing houses and thus in many cases assists in building up carload shipments for points along the line.

In giving local freight service, an electric railway must remember that its patrons from the millionaire wholesaler down to the cross-roads storekeeper watch and comment upon such service. The storekeeper is anxious about his small shipment, just as the carload dealer looks after his in seeing that it is not delayed in transit. The delivery of merchandise or l.c.l. shipments promptly and in good condition assists unquestionably in keeping down criticism and, above all things, in cutting down claims.

The freight loaders should understand the handling and the storing of commodities so that the train crew can unload the freight promptly without searching the cars over and possibly carrying the shipment by. A record should be made of all cases where the packages show signs of rough handling. Any packages bearing evidence of pillage should have their contents carefully collected, and a proper record should be made for future reference when claims are presented.



Each freight house along the line should be provided with a door of the correct height according to the cars. It should also have a gang plank long enough to reach from the car door to the freight-house door so that freight for inland towns and freight which cannot be delivered on the day of arrival can be safely and easily placed in the house; likewise in order that freight from the house may be so placed in the car. Usually the station agent will have some arrangement with the town draymen to be on hand if the arrival time of local trains can be depended upon, and these men will handle a lot of freight direct from the cars to the consignees. Of course, where night operation prevails (which must be resorted to by electric railways), it is necessary for the freight in many cases to be placed in the freight-house by the crew.

The crews for local freight should be among the best in the service as far as the employees' schedule will permit. By a little diplomacy the employing officer can secure good experienced men on these trains. They should be able-bodied men weighing at least 150 to 160 lb. The conductor should be a man more than fairly educated, not easily excited, polite, able to render his reports accurately, and immune from the charge of laziness. He should also have some executive ability in order to secure the full support of his motorman and other members of his crew if any.

Accidents should be kept down to a minimum. This especially refers to switching at stations to avoid collisions with vehicles on crossings, laborers loading and unloading cars on industry tracks, children playing around the station grounds, and passengers in general.

On a railroad where sufficient traffic prevails and where the "local" is in the form of a long train operated during the day, the yard master should see that the cars are properly placed in the train and in good condition. This is necessary so that when the conductor checks the train, he will not have to go to the office and advise that there is a wrong car in the train or one that must be "set out" on account of some defect. Either of these conditions might result in considerable terminal delay and overtime.

Usually the local crew does all the station switching up to where it meets the train running on the opposite local run. It moves all intermediate loads and as far as possible bunches through loads originating at way-stations for through freight or "drags" to pick up without switching at designated points.

When the local trains are of any length, the agents can be of great assistance in expediting movement by telephoning to the conductor in advance the amount of switching in order that the crew may be informed as to the character and the volume of work and can arrange that work may be saved farther down the road in making "setouts" and "pickups." The agent's helpers and operators should be lined up at the station upon the arrival of the local train and help as much as possible in handling the freight.

The conductor should be on the locomotive or front motor car when approaching stations where switching is to be done, and by the time the merchandise cars



TYPICAL INTERURBAN FREIGHT LOCOMOTIVES ON  
ELECTRIC LINES

Pacific Electric Railway—60 tons.  
Detroit United Railway—50 tons.  
Sand Springs Railway—50 tons.  
Lewisburg & Ronceverte Electric Railway—30 tons

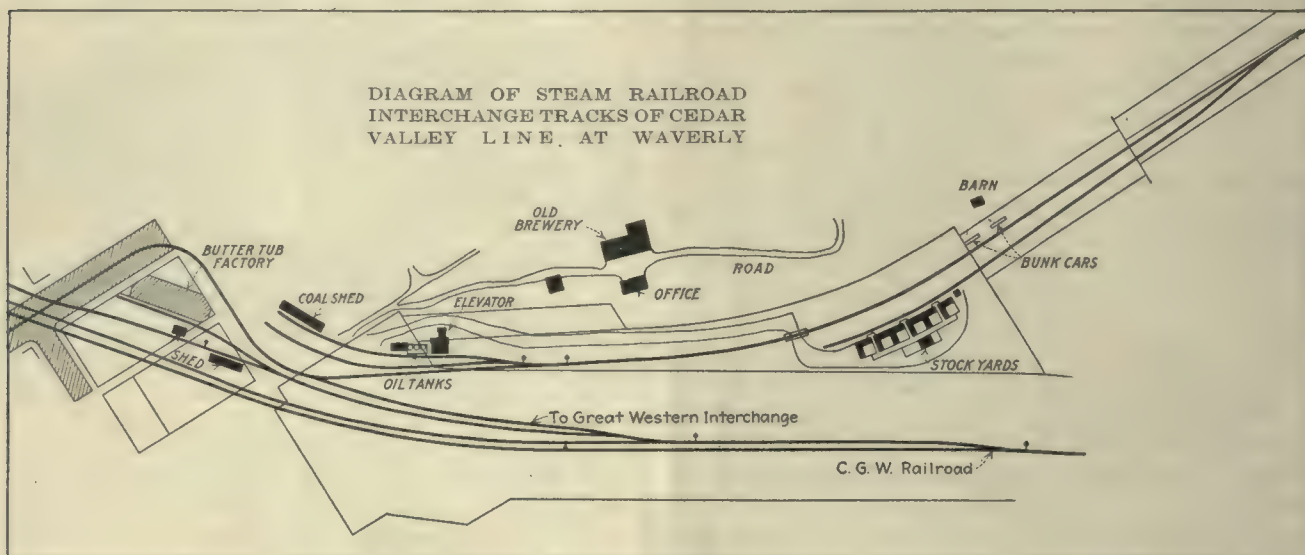


have been "spotted," he will have in hand a program of the necessary work and see that it is properly performed with all speed consistent with safety. As soon as the situation has been sized up, he should advise the dispatcher as to the approximate length of time he will be at the station, in order that the latter may have information on which to base his figures as to the movement of opposing trains. Usually it is the custom for a local crew to take dinner at some convenient place, and the conductor should make this arrangement in advance and notify the dispatcher.

In all cases the dispatcher should receive notification of all movements and any advance information as to prospective movements or delay to traffic, to enable him to fortify himself against delays of many kinds. Wrong information given him may in many cases cause trains

Another type of interchange is that which is merely either a side track, or part of a wye between steam and electric lines, of one or two cars capacity. A typical example of steam railroad interchange, shown in the accompanying diagram, is that of the Waterloo, Cedar Falls & Northern Railway, which was one of the pioneer electric lines to compel steam railroads to interchange freight with electric lines. More than 70 per cent of the switching from steam roads entering Waterloo is performed by this line.

Many of the 155 factories of Waterloo are located on the electric belt line belonging to the Cedar Valley road. Moreover, a 60-mile branch of the electric line from Waterloo to Cedar Rapids forms a feeder for the steam lines entering Cedar Rapids. There the Cedar Rapids Terminal & Transfer Company receives traffic



to be "knocked down." In every case it must be remembered that the dispatcher is as much interested in having trains move promptly over any division as any other individual connected with the road.

#### INTERCHANGING WITH STEAM RAILROADS

A number of electric railways throughout the country enjoy full interchange privileges with the steam railroads. Among these lines are the Fort Dodge, Des Moines & Southern Railroad, the Niagara Junction Railway, the Toledo & Western Railroad, the Michigan Railway, the Interurban Railway (Des Moines), the Detroit United Railway, the Chicago, Lake Shore & South Bend Railway, the Waterloo, Cedar Falls & Northern Railway and a number of others. This service is highly desirable. In many cases interchange business has been found to be very profitable, and it is worth due consideration by all electric lines.

To handle steam railroad interchange, proper facilities must be laid out at important checking points on the electric lines. Usually these interchanges take the form of a steam road delivery track and an electric railway delivery track, having leads running from both the steam and the electric lines at each end of the interchange. The length of interchange depends entirely upon the car capacity demanded by the volume of business.

from the electric and steam lines, distributes the shipments and handles local switching. Thus by this transfer line the several steam roads entering Cedar Rapids are able to enjoy from the northern territory business which they were unable to receive prior to the construction of the Cedar Valley road.

At Waterloo interchange connections are made with the Illinois Central, the Chicago, Rock Island & Pacific and the Chicago Great Western Railroads. At Waverly such connections are made with the Omaha Division of the Chicago Great Western; at Cedar Falls, with the Chicago Great Western Railroad, and at Cedar Rapids, with the Chicago, Milwaukee & St. Paul Railway, which handles all the cars to and from the Chicago & Northwestern, the Chicago, Rock Island & Pacific and the Illinois Central Railroads, for points served from Cedar Rapids as well as for industries in Cedar Rapids.

Roads doing the standard steam-road business understand, of course, that all interchange of equipment comes under the M. C. B. rules. In operating interchange service, therefore, it is very important that the electric railway also obey these rules.

Proper account must be made of all car repairs, as the rules hold the car owners responsible for repairs made necessary by ordinary wear and tear in service. The company handling the cars is responsible for damage done by unfair usage, derailment, etc., and must



TABLE I—FREIGHT MOTIVE POWER AND CAR EQUIPMENT DOING A MAN'S SIZE FREIGHT BUSINESS ON A 100-MILE ELECTRIC RAILWAY

Number of Units	Type	Freight Motive Power Equipment										Freight Car Equipment					
		Motors				Service		Body		Trucks	Number of Cars	Type	Capacity in Pounds	Service	Body Length	Truck Wheels	
		Total Weight in Pounds	Gear Ratio	Hp.	Volt	Capacity in Tons	Class	Width	Length	Wheelbase							Wheel Diameter
1	Double-truck locomotive	120,000	16:57	250	650 1300	†800	Fast freight....	9' 1"	35' 0"	7' 6"	36"	20	Stock.....	60,000	General interchange freight	36' 8"	33"
1	Double-truck locomotive	120,000	16:57	250	650 1300	†800	Fast freight....	9' 1"	35' 0"	7' 6"	36"	40	Gondolas....	100,000	General interchange freight.....	40' 0"	33"
1	Double-truck locomotive	120,000	16:57	250	650 1300	†800	Fast freight....	9' 1"	35' 0"	7' 6"	36"	50	Automobile box	80,000	General interchange freight	40' 8"	33"
1	Double-truck locomotive	120,000	16:57	250	650 1300	†800	Fast freight....	9' 1"	35' 0"	7' 6"	36"	6	Refrigerator..	40,000	L.C.L. merchandise	35' 0"	33"
1	Double-truck locomotive	120,000	16:57	250	650 1300	†800	Fast freight....	9' 1"	35' 0"	7' 6"	36"	35	Flat.....	60,000	Interchange freight, stone, gravel, etc.	36' 0"	33"
1	Double-truck locomotive	95,000	17:73	100	650	*500	Switching.....	9' 8"	33' 4"	6' 6"	33"	2	Four-wheel cabin car	.....	Main line.....	.....	33"
1	Double-truck locomotive	83,400	16:82	75	650	*500	Switching.....	9' 6"	30' 0"	6' 0"	33"	1	Four-wheel cabin car	.....	Main line.....	.....	33"
1	Double-truck package car	80,000	16:73	90	650 1300	*500	†Freight—all lines	9' 2"	53' 2"	6' 11"	33"	1	Eight-wheel caboose	.....	Main line.....	42' 0"	33"
1	Double-truck package car	80,000	17:58	100	650	*500	†Freight—650-volt only	9' 2"	53' 2"	6' 6"	33"	6	Box.....	40,000	On company lines only	34'	33"
1	Double-truck package car	56,000	17:69	40	650	....	Freight—650-volt only	9' 0"	52' 2"	6' 3"	33"	13	Box.....	40,000	Bunk cars.....	34'	33"
1	Double-truck trap car	32,200	17:69	40	650	\$60,000	L.C.L. freight..	9' 8"	41' 0"	5' 6"	33"	.....	.....	.....	.....	.....	.....
1	Double-truck trap car	32,200	15:71	40	650	\$60,000	L.C.L. freight..	9' 8"	41' 0"	5' 6"	33"	.....	.....	.....	.....	.....	.....

† Continuous rating on 1 per cent grade; full speed, 1300-volts; half-speed, 650-volts.

\* One-hour rating.

† Also used for special train movements requiring baggage space with coach.

§ Pounds.

provide the proper loading and handling for cars interchanged.

On the Cedar Valley road two inspectors are located at Waterloo and one at Cedar Rapids to facilitate interchange inspection. They look over all cars passing their respective interchanges and make out daily interchange reports to the master mechanic. If a car needs repairs, the inspector notes the trouble in the repair book, a record from which is sent to the master mechanic each month. Cars that cannot be repaired at the interchange, or those requiring heavy repairs, are "carded" according to M. C. B. rules and disposed of either by turning them over to the receiving road or by sending them to the Cedar Valley shops.

On the "rip" track in the shop yards all defective cars of the electric line are placed in first-class condition. Repairs are made according to the "defect" cards on the rolling stock. "Bad order" cards are placed on cars that should not be reloaded but sent home, if possible.

At interchange points trainmen inspect the cars. Their daily interchange report is sent to the master mechanic. If the train crew makes repairs (such as installing new air hose, knuckles, etc.), a trainmen's

repair card is made out. This card for the master mechanic describes the repairs made.

In general, repairs are made by inspectors and trainmen as far as possible. If they cannot be so made but can be handled by one or two car repairers with tools, such employees are sent out and the car is not brought onto the "rip" track. Thus unnecessary movements are avoided.

Once every month there is a settlement due to interchange repairs and also a settlement on the per diem basis in accordance with the standard practice of steam railroads. (This has been abandoned during the government control.)

### 3000 FREIGHT TRAILERS NEEDED

One of the most important needs of electric railways is sufficient freight rolling stock. This does not necessarily apply to the motive-power rolling stock, but to trailer cars. If from 2000 to 3000 electric freight trailer cars could be distributed over the electric lines, the electric railway freight situation would be considerably improved.

Many lines say that they have all the freight that can possibly be handled, and the overflow goes to the

TABLE II—GENERAL DIMENSIONS OF STANDARD FREIGHT CARS OF UNITED STATES RAILROAD ADMINISTRATION

	40-Ton Double Sheathed Box	40 and 50-Ton Steel Frame Single Sheathed Box	50-Ton Steel Gondola	50-Ton Composite Gondola	70-Ton Steel Gondola	55-Ton Hopper	70 Ton Hopper
Length, inside.....	40 ft. 6 in.	40 ft. 6 in.	41 ft. 6 in.	41 ft. 6 in.	46 ft. 6 in.	30 ft. 6 in.	39 ft. 6 in.
Width, inside.....	8 ft. 6 in.	8 ft. 6 in.	9 ft. 4½ in.	9 ft. 1½ in.	9 ft. 6 in.	9 ft. 5½ in.	9 ft. 5½ in.
Height, inside.....	9 ft. 0 in.	9 ft. 0 in.	4 ft. 8 in.	4 ft. 8 in.	3 ft. 0 in.	31 ft. 11 in.	40 ft. 5 in.
Length over striking plates.....	42 ft. 1½ in.	42 ft. 1½ in.	42 ft. 10½ in.	42 ft. 10½ in.	48 ft. 7 in.	31 ft. 11 in.	40 ft. 5 in.
Width over eaves.....	9 ft. 4 in.	9 ft. 4½ in.	10 ft. 2½ in.	10 ft. 2½ in.	10 ft. 3½ in.	10 ft. 2½ in.	10 ft. 2½ in.
Width over all.....	10 ft. 2½ in.	10 ft. 2½ in.	10 ft. 2½ in.	10 ft. 2½ in.	10 ft. 3½ in.	10 ft. 2½ in.	10 ft. 2½ in.
Height from rail to top of car at eaves.....	12 ft. 10½ in.	12 ft. 10½ in.	8 ft. ¾ in.	8 ft. ¾ in.	6 ft. 4½ in.	10 ft. 8 in.	10 ft. 8 in.
Height from rail to top of car body.....	14 ft. 1½ in.	14 ft. 1½ in.	8 ft. 7½ in.	8 ft. 10½ in.	7 ft. 1½ in.	11 ft. 2½ in.	11 ft. 2½ in.
Height from rail to top of brake mast.....	13 ft. 6½ in.	13 ft. 6½ in.	8 ft. 7½ in.	8 ft. 10½ in.	7 ft. 1½ in.	11 ft. 2½ in.	11 ft. 2½ in.
Height from rail to top of running board.....	14 ft. 1½ in.	14 ft. 1½ in.	8 ft. 7½ in.	8 ft. 10½ in.	7 ft. 1½ in.	11 ft. 2½ in.	11 ft. 2½ in.
Distance center to center of trucks.....	31 ft. 1½ in.	31 ft. 1½ in.	31 ft. 10½ in.	31 ft. 10½ in.	37 ft. 7 in.	21 ft. 11 in.	30 ft. 5 in.
Height from rail to center of coupler.....	2 ft. 10½ in.	2 ft. 10½ in.	2 ft. 10½ in.	2 ft. 10½ in.	2 ft. 10½ in.	2 ft. 10½ in.	2 ft. 10½ in.
Height from rail to bottom of center sill.....	2 ft. 4½ in.	2 ft. 4½ in.	2 ft. 4½ in.	2 ft. 4½ in.	2 ft. 4½ in.	2 ft. 4½ in.	2 ft. 4½ in.
Cubic capacity—level full.....	1,820 cu.ft.	1,820 cu.ft.	1,820 cu.ft.	1,770 cu.ft.	.....	1,880 cu.ft.	2,508 cu.ft.
Cubic capacity—with 30 deg. heap.....	2,310 cu.ft.	2,310 cu.ft.	2,310 cu.ft.	2,230 cu.ft.	.....	2,235 cu.ft.	2,978 cu.ft.
Estimated weight.....	44,000 lb.	44,000 lb.	42,000 lb.	40,000 lb.	49,500 lb.	40,000 lb.	49,500 lb.



steam or motor truck lines. In many cases this is business gone forever. The loss could have been prevented if the electric lines had possessed adequate equipment. For example, Table I shows the freight motive power and car equipment used in handling a "man's size" freight business on a 100-mile electric line.

The pooling of freight trailer equipment would considerably assist in the extension of electric railway

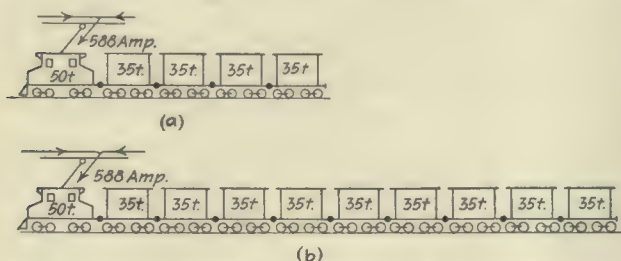


FIG. 1—SLOW-SPEED LOCOMOTIVE EQUIPMENT (b) OUTHAULS CAR-TYPE MOTORS WITH MAXIMUM GEAR REDUCTION (a)

freight haulage throughout the country. Moreover, it would aid in standardizing electric railway rolling stock. One of the drastic needs of such carriers is standardization of rolling stock, if they ever expect to do a universal freight business. This is true more particularly of freight than of passenger cars, as the latter are not used so much in inter-line service.

With an electric railway freight interchange pool in operation, the disease of localism in the case of many properties would be stamped out. This particularly refers to the deliberate refusal to apply couplers and other mechanical parts so that cars can be used in freight interchange over the various electric lines.

Table II gives the general dimensions of the United States Railroad Administration standard freight cars.

#### LAYING THE MOTIVE POWER GHOST

One of the ghosts to the average operating man contemplating freight haulage is that the power house and substation equipment will not permit it. This

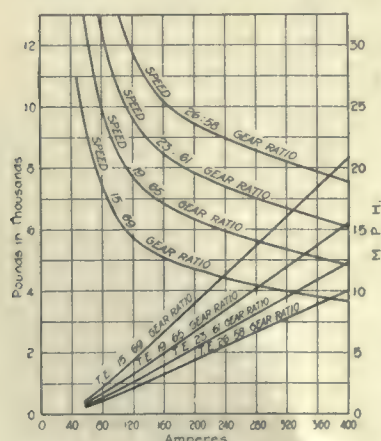


FIG. 2—CHARACTERISTIC CURVES FOR CHANGING GEAR RATIOS

one bugaboo has in too many cases stood in the way of the development of a freight service that would be a great economic aid to the community served and a revenue builder to the company. Hence it would be well for all railway men to analyze their power conditions before permitting

themselves to be frightened away from lucrative revenue and the possibility of rendering invaluable service.

Analysis will show that for freight service, whether the motive-power equipment is placed under a flat car or a regular electric locomotive, there must be some differentiation in the design from that for passenger propulsion. The use of passenger motive power equipment

should be eliminated entirely in considering freight service. Speed is obtained at the expense of power, and the fact that many roads operate motor-car freight service on practically passenger time has led operating officials to believe that all freight service exacts a large amount of power. But freight trains need not move at passenger speeds.

This being the case, there are two ways for existing systems to develop freight service:

1. Equip freight motor cars with slow-speed locomotive motors capable of propelling the motor car and hauling from two to five trailers. This type of operation could in many cases be handled during the day, between passenger trains, through the provision of long sidings.

2. Carry on heavy drag freight operation with slow-speed motor equipped electric locomotives hauling standard steam railroad and interurban freight cars during the early hours of the morning.

During the off-peak hours on many systems there is practically no operation, and hence no earning on the

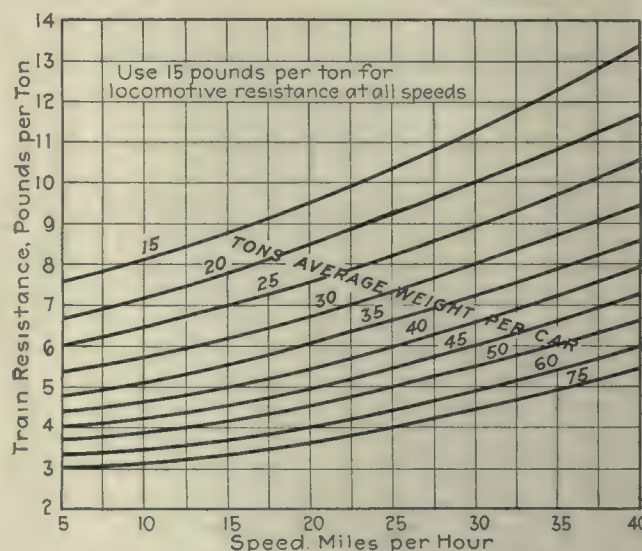


FIG. 3—FREIGHT TRAIN RESISTANCE CURVES

idle investment. Therefore, freight service in such cases when properly developed can increase the revenue and materially help the load factor. The use of slow-speed locomotive motors with their low power demand for relatively high tractive efforts has made freight haulage possible on many roads of limited substation and feeder capacity.

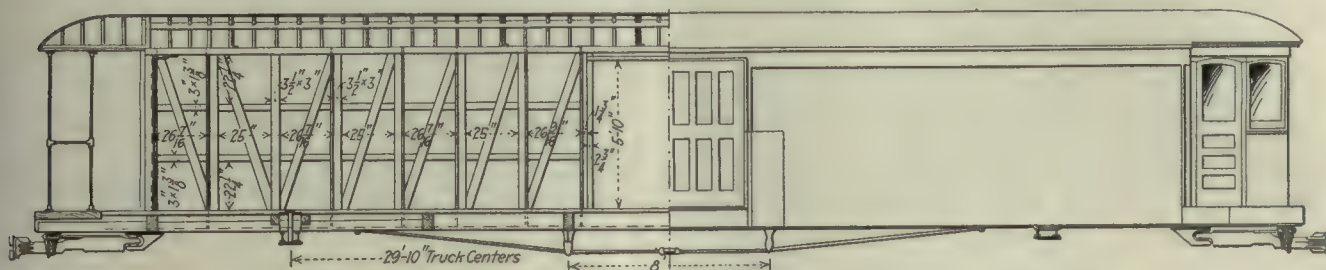
Fig. 1 indicates the superiority of the regular slow-speed locomotive motor equipment over car-type motors with maximum gear reduction. In A the 50-ton locomotive with four 100-hp. car type motors with maximum gear reduction can haul only 140 tons at 16.75 m.p.h., whereas the same locomotive (B) equipped with four 100-hp. regular slow-speed locomotive motors can haul 315 tons under the same conditions and power demand.

Many railways have equipment that could be pressed into freight service with little more than a change in gear ratio. This also applies to freight motor cars which now approximate passenger speeds but really are more desirable for hauling three or more trailers during off-peak hours at lower speeds.



In effecting this change, the characteristics of the motor must be considered. For slow-speed freight service generally, the maximum reduction gearing is most satisfactory. It must be remembered that with high-speed gearing the power demands are increased while the rating remains the same. With high-speed motors,

motive type, and drum or multiple-unit control. All freight motive power equipment must do some switching, and this often demands that circuits carrying heavy currents be broken, which is particularly damaging to control equipment. It is highly important that the motors be properly applied to meet the service require-



ELEVATION OF MOTOR FREIGHT CAR USED BY DETROIT UNITED RAILWAY

however, the power demands increase with the revolutions per minute, and the motor heating, while higher, equalizes for the higher power requirements of this type of motor.

From the characteristic curves shown in Fig. 2 it will be noted that the speed varies inversely as the ratio of gear teeth to pinion teeth, and that the tractive effort varies directly as the ratio. With an increase in speed at any given current, the tractive effort proportionally decreases. The high currents required by high-speed gearing can be readily seen from these curves. In spite of this, many roads are operating freight equipment with motors geared for the same speed as that of their high-speed passenger cars. This is dearly paid for by excessive motor maintenance, by high energy consumption at the car, by high line losses, by overloaded substations in some instances, and last, but not least, by restricted freight hauling capacity. There are many cases of single freight car operation where several trailers could be handled by slow-speed motor equipment.

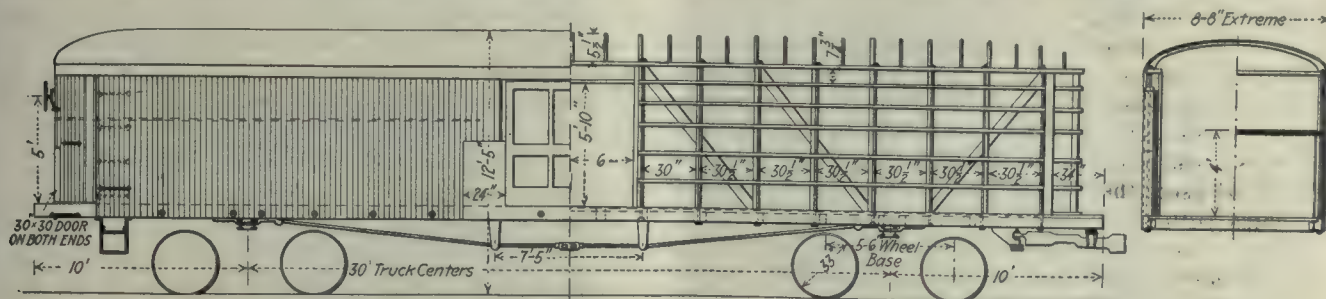
A freight motor car adapted for single-car operation or able to haul from three to five trailers is one of the most valuable types of motive power an electric railway can use. This provides single car rolling stock

ments, and that a control be used which can stand the heavy duty imposed on any control equipment used in freight service.

Often where single motor-freight car operation has been going for some time, and the freight business has been growing so that it becomes necessary to handle trains, a convenient method of expediting the movement of freight is to equip the motor cars with multiple-unit apparatus so that two motor cars coupled together and operated by one motorman can handle several trailers.

The Empire United Railways of Rochester handles such service, as it has in operation five multiple-unit freight cars equipped with modern railway motor unit switch control arranged to operate in trains. The plan of operation provides for two and three-car trains, thus approaching more nearly steam traffic conditions. The service rendered by this line is superior to that afforded by steam roads, and the cost of operation is such as to allow a profit at the steam road rates. The Northern Ohio Traction & Light Company is another electric line which uses multiple-unit equipped freight cars.

After the business of a road has become great enough through the building up of traffic by the use of motor car trains of one motor car and several trailers, or two



ELEVATION OF FREIGHT TRAILER USED BY DETROIT UNITED RAILWAY

where the service is of the dispatch nature, and where the service demands the handling of carload freight, the freight motor car type permits flexible operation. When operating a train the freight motor car can act as a peddler or merchandise car while the other cars, which are ordinary trailers of either interurban or steam railroad type, may be "set out" at any station.

The equipment of these freight motor cars usually includes four motors, preferably of the slow-speed loco-

motor cars operating in multiple-unit with trailers, locomotive operation becomes practicable. This is particularly true where a steam railroad interchange service has been developed, as it is very important that, irrespective of the length of the "cut" of cars left by the steam railroad on an interchange, the electric line have motive power to handle this expeditiously. If it does not, the electric interchange service receives a "black eye."



G. M. Woods in the *ELECTRIC RAILWAY JOURNAL* of June 1, 1918, in an article on "Freight Motive Power Equipment" goes into detail as to how many existing interurbans, with their present electrical equipment, can successfully handle freight by means of both freight motor cars and electric locomotives. He also explains how the present substation capacity of many of these lines can handle such service.

USING ELECTRIC LOCOMOTIVES

Two of the most important factors to be considered in handling freight by electric locomotive are the reliability of equipment and continuity of service. The first is of prime importance in that on many roads there are but one or two electric locomotives, and these must be in condition for service at all times regardless of the fact that they must be kept in operation as much as possible.

In designing locomotive equipment, five points must be kept in mind:

1. The weight, type, capacity and mechanical design must be suitable for the service requirements.
2. Motive-power apparatus must be selected that will meet the service conditions.
3. The apparatus on the locomotive should be mounted in such a way that each part will be permitted to operate to the best advantage, with the least danger of trouble.

4. All apparatus should be accessible for inspection, maintenance and overhauling.

5. There should be no danger of the operator being thrown into contact with the live parts.

Standard interurban freight locomotives are usually of the "steeple" type, which is often preferable to the "box" in appearance and eliminates compressor noise. The cab proper is usually built of steel with rolled steel channels for underframe. A hardwood floor can be provided in the cab, while a checker-plate walking platform is used outside of the cab. All-metal bumpers should be used, the splintering so often found in wood bumpers with steel plates being thus avoided.

M. C. B. couplers mounted in bumper pocket castings are standard, but where trailing loads must be hauled around short radius curves, these couplers may be mounted on radial drawbars. Friction draft gear or spring draft gear can be supplied to meet severe conditions. When the weight of a given type of locomotive of a sufficient electrical capacity is less than the weight required from the standpoint of adhesion, additional weight can be added, principally by strengthening the various members instead of adding ballast.

The electric freight locomotive trucks are usually of the rigid-bolster equalized-pedestal type, possessing the advantages of a minimum number of wearing parts, no

projecting springs and the provision of substantial means for transmitting the high tractive efforts required in freight service. The various members of the trucks are held together by tapered bolts in reamed holes. Swivel trucks with brakes actuated through a radius bar are standard, owing to the ease with which they negotiate short radius curves.

The preliminary determination of the minimum weight of locomotive for any given service may be made from the weight of the trailing load, average car weight, speed, grade and service—together with the probable train resistance values and a reasonable assumption of acceleration and adhesion factors. It is also necessary to know what the drawbar pull would be under the worst running and starting conditions of resistance.

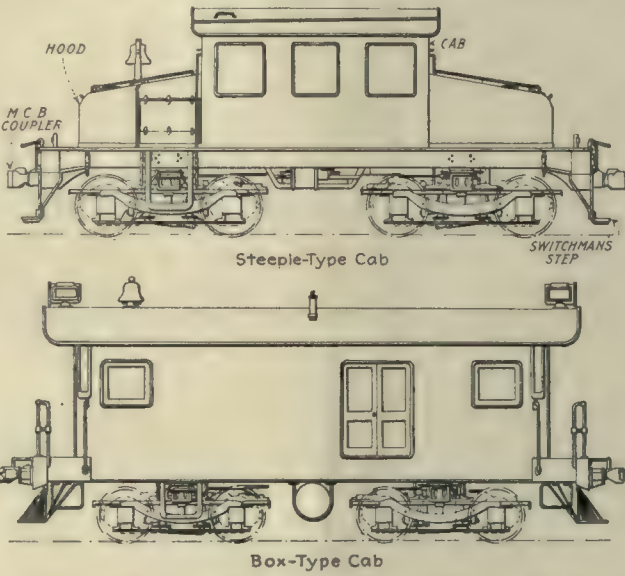
Table III shows the weight of train that can be started on a given grade. "Train resistance" applies to the friction and windage of a train in motion; it is a variable rather than a constant quantity. The values that may be used for freight trains are shown in Fig. 3. Curve resistance is also a variable, but an average may be taken at 0.8 lb. per ton per degree of curvature.

Grade resistance requires 20 lb. per ton (2000 lb. for each percentage of grade against the load). In starting, the drawbar pull must exceed that in running by an amount sufficient to accelerate the train at the desired rate. If there

are no rotating parts, a force of 91.3 lb. per ton is sufficient for acceleration at the rate of 1 m.p.h.p.s., but to allow for the effect of rotating parts it is customary to consider 100 lb. per ton as necessary for acceleration at the rate of 1 m.p.h.p.s. For other rates, the force required is in direct proportion to the rate of acceleration. Reasonable and common rates of acceleration for heavy freight service are 0.1 m.p.h.p.s. or 10 lb. per ton for pick-up and 0.25 m.p.h.p.s. or 25 lb. per ton for way freight.

DETERMINING LOCOMOTIVE WEIGHT

A simple formula for locomotive weight under known conditions is given on the next page.



DIAGRAMS OF STEEPLE AND BOX-TYPE CABS OF ELECTRIC LOCOMOTIVES

TABLE III—WEIGHT OF TRAIN THAT CAN BE STARTED ON A GIVEN GRADE					
Assumed data:					
Train friction.....					
Acceleration.....					
Coefficient of adhesion.....					
10 lb. per ton					
20 lb. per ton					
25 per cent					
TONS WEIGHT OF TRAILING TRAIN					
Weight of Locomotive Tons	Grade				
	1%	2%	3%	4%	5%
25	225	155	115	90	70
30	270	185	135	105	85
40	360	245	180	140	115
50	450	310	230	180	140
60	540	370	270	210	170
70	630	430	320	250	200
80	720	490	365	280	230
90	810	550	410	320	255
100	900	615	455	355	285





INTERURBAN FREIGHT TRAILER USED IN DETROIT  
UNITED INTERLINE SERVICE



STANDARD TYPE OF CABOOSE USED ON THE  
FORT DODGE LINE

$W$  = Locomotive weight (tons) on drivers.

$L$  = All resistance acting on locomotive, in pounds per ton.

$T$  = Weight of trailing load (tons).

$R$  = All resistance acting on trailing load, in pounds per ton.

$P$  = Assumed percentage of adhesion.

$$(a) \quad P(2000)W - LW = TR$$

$$(b) \quad W = \frac{TR}{(2000P - L)}$$

The adhesion of the driving wheels is variable, depending upon the weight of the rail, weather conditions, air surface of rail, etc. Adhesion frequently is 25 per cent of the weight of the locomotive when running and about 33 per cent of the weight of the locomotive when starting. On long grades, these figures may be reduced to 22 per cent for running and 27 per cent for starting. In the use of these percentages for adhesion, the total tractive effort for train and locomotive is employed and not the ratio of drawbar pull to locomotive weight on drivers, the latter practice being commonly followed in rating locomotives.

As an example: What is the minimum weight of electric locomotive, all on drivers, to handle a trailing load of 1000 tons gross in twenty-five cars on a road having a maximum compensated grade of 2 per cent for 2000 ft., and 1.5 per cent for 10 miles, a speed of

approximately 15 m.p.h. being desired on the long grade?

Consider the starting conditions first. From Fig. 3 the train resistance is 5 lb. per ton, and the locomotive resistance is 15 lb. per ton. The resistance of the 2 per cent grade is 40 lb. per ton. Allow 10 lb. per ton for acceleration. Then the starting drawbar pull is:  $(5 + 40 + 10) 1000 = 55,000$  lb. Let the locomotive weight in tons be  $W$  and assume 33 per cent adhesion. Then

$$\frac{25}{100} (2000) W - 55 W = 45,000$$

$$\text{or} \quad 445 W = 45,000 \text{ and } W = 101 \text{ tons.}$$

When starting on the long 1.5 per cent grade at 27 per cent adhesion, the drawbar pull is 45,000 lb.

$$\frac{27}{100} (2000) W - 55 W = 45,000$$

$$\text{or} \quad 485 W = 45,000 \text{ and } W = 92.9 \text{ tons.}$$

When running at 22 per cent adhesion, the draw-bar pull is 35,000 lb., and

$$\frac{22}{100} (2000) W - 45 W = 35,000$$

$$\text{or} \quad 395 W = 35,000 \text{ and } W = 88.6 \text{ tons.}$$

Hence, for this set of conditions, the running adhesion on the short 2 per cent maximum grade is the determining feature, and the locomotive should weigh



60-Ton Road Locomotive



40-Ton Belt-Line Switching Locomotive



not less than 100 tons. Judgment must be exercised, however, in the practical determination of weight. For instance, the bare figures in the foregoing indicate that a 100-ton engine is required. Suppose, however, that the 2000-ft. 2 per cent grade is preceded by a long-level or down-grade run without stops so that it could always be taken "on the run." In such a case, the figures show that a 98-ton engine would be of ample weight.

The economical speed of a freight train depends a great deal upon the electrical equipment. "Drag" or "tonnage" freights may well be operated at 15 m.p.h., while despatch freight service can easily be handled by trains at 30 m.p.h. Speeds above this become not only uneconomical but dangerous, being conducive to increasing claims and damage to equipment. In switching service a maximum speed of 8 m.p.h. for yard work is economical and safe.

#### SIGNALING MUST BE PROVIDED

In order to operate freight service safely, a company must provide for proper signaling. The illustration below shows block-signal protection for freight operation. Signal No. 1 governs trains moving in the



BLOCK SIGNAL PROTECTION FOR FREIGHT OPERATION ON ELECTRIC RAILWAY LINES

direction of the arrow, while signal No. 7 governs trains moving in the opposite direction.

The freight cars shown in the siding are protected because signal No. 1 displays a "proceed" indication. This signal would be in the "stop" position if switch point 2 were not closed. This feature of protection is accomplished by the use of a switch circuit controller, 3, which is mechanically connected to the switch point. This in turn is equipped with contacts of such a design as to permit a fine adjustment, which causes the circuit controlling signal No. 1 to be taken over the contacts in switch circuit controller 3. Whenever the switch point 2 is not closed to within  $\frac{1}{2}$  in. of its full stroke, the control circuit for signal No. 1 is interrupted.

This control of signal No. 1 not only guarantees protection to the cars in the siding but also protects cars on the main line (approaching the facing switch as indicated by the arrow) from unexpectedly running into switch 2 when the points are open. Signal No. 1 in

the 60-deg. position as shown in the illustration indicates to the approaching car that the switch is closed. This shows the motorman that he may pass this point at full speed, having assurance that the switch is properly set and that the next block is clear.

Another important feature of protection is that which permits a train to approach the siding at high speed in either direction on the main line. The automatic signals are controlled by track circuits, which extend from signal to signal. By this means a clear signal guarantees that the main-line track is free from obstruction. Wherever there are sidings leading into the main line track, the track circuit is carried back into the siding to a "fouling" point. This guarantees that cars must be pulled into the siding so as not to "foul" a train on the main line before the signals on the main line will "clear." This is a strong point in favor of the use of automatic block signals where freight operation is contemplated. There is a tendency, especially where sidings are crowded, to allow cars to "foul" the main line.

The illustration also shows the location of the insulated rail joints which determine the limits of the track circuit as it extends into the siding. At the point



SIGNAL PROTECTION FOR A BELT-LINE FREIGHT CUT-OFF ON THE I. T. S.

opposite the two signals is located an impedance bond layout between the rails (at 4). The bonds offer practically no resistance to the return of the direct current propulsion currents, but they introduce an impedance to the alternating current which is used for the control of the track circuit apparatus.

Signal apparatus, such as relays, transformers, lightning arresters, etc., are sheltered in the cases at the base of the signals, as indicated by 5.

At each signal location a main-line transformer, usually of 1 kva. capacity, is installed to step alternating current energy down from transmission voltage (anything from 2200 to 6600 volts) to 110 volts. This main-line transformer is indicated as 6. The 110-volt energy is used for the operation of the signal motors and also for the primary circuit of the track transformer. The secondary voltage of the track transformer is such that by the use of various combinations of taps, a variation in voltage can be realized anywhere from 4 to 15 volts.



Such is a brief description of some of the facilities that are needed for developing a real freight business.

Unfortunately, electric railway managements have been in the habit of providing facilities sufficient to meet demands six months or a year hence, while steam road practice anticipates from five to ten years and often more. This condition may be due to the more or less restricted finances of the electric railway industry, but it should be overcome in developing freight business.

It is commercially possible to obtain freight motive-power equipment to handle successfully any weight of train that freight conditions may demand.

Therefore, electric railway freight haulage is not only practicable but profitable, and it can be developed by the proper co-ordination of existing facilities, equipment, and executive and engineering talent.

## Organization and Procedure of A. E. S. Committee Explained

In His Address Before A. I. E. E. Last Week C. A. Adams Explained Plans of New American Engineering Standards Committee

AT THE midwinter convention of the American Institute of Electrical Engineers, held in New York City last week, President Comfort A. Adams devoted his entire address to the subject of standards and standardization. After showing how chaotic is the condition of standardization practice he outlined the plan and scope of the work of the newly-formed American Engineering Standards Committee, substantially as follows:

This committee was formed by joint action of five national engineering societies (A. S. C. E., A. I. M. E., A. S. M. E., A. I. E. E. and A. S. T. M.), called the "founder societies," to provide machinery for the development of engineering and industrial standards, by the operation of which duplication would be avoided and co-operation between all interested organizations and government departments secured.

The A. E. S. committee machinery now proposed for the development of standards comprises these elements:

1. The committee proper, or "main committee," with three representatives from each of the five founder societies and three government departments, whose functions are chiefly those of organizing, co-ordinating and "steering."
2. Sectional committees, one for each group of standards with representatives from all organizations and government departments vitally interested in particular groups of standards. Their function is to prepare standards under the direction of the most vitally interested organization, known as the "sponsor body."
3. The "sponsor body" or "body" may be one of the founder societies, a government department, or one of the co-operating societies or organizations.
4. "Co-operating societies," intended to include all organizations interested in the production of standards and willing to co-operate.

When the development of a particular group of standards is proposed, the main committee assigns the work to the appropriate organization as "sponsor," or, if the

situation seems to indicate that more than one organization is equally interested, to these organizations as "joint sponsor."

The sponsor then appoints the sectional committee subject to the approval of the main committee, this approval being merely to assure a comprehensive representation of all interests involved. Complete records of all interested organizations and of their standardization work will be kept on file and properly classified in the office of the main committee. This committee, or its secretary, will thus be able either promptly to suggest the proper representation to a sponsor on request or to approve or amplify the representation as provisionally proposed by the sponsor.

After a group of standards has been prepared and accepted by a sectional committee, it is submitted to the sponsor body for its approval and then to the main committee with a full report of its history. When approved by both the sponsor body and the main committee, the standards in question become "American Standards."

When the report of any sectional committee is being considered by the main committee, three members of that sectional committee are invited to sit with the main committee to report, discuss and vote on the standards in question as if they were regular members of the committee. Thus each sectional committee, and therefore usually each sponsor body, will be represented on the main committee when standards in which they are interested are being discussed.

The scrutiny of a standard by the main committee is to make sure that the proper procedure has been followed, that the vote of acceptance was nearly enough unanimous, and that the standard is consistent with other related standards. Consideration is also given to international relations, but the main committee is not expected to pass upon details.

After approval by the main committee the standard is published by the sponsor body, with the statement that it has been approved by the A. E. S. committee, and labeled "American Standard" with the appropriate descriptive title.

### THE WHOLE PLAN IN A NUTSHELL

Briefly summarized this procedure is as follows:

1. Standard assigned by main committee to sponsor body.
2. Sponsor body appoints a thoroughly representative sectional committee, subject to approval of main committee.
3. Sectional committee prepares standard and submits to sponsor body, which then submits standard with its approval to the main committee.
4. The standard is then published by the sponsor body and labelled "American Standard."

The machinery thus provides for comprehensive co-operation and eliminates duplication of effort, but does not undesirably restrict the initiative of the several co-operating societies. With proper support and co-operation it should contribute largely to the industrial development of the country and become a potent factor in promoting international standardization and foreign commerce.



# How Can the Public Be Convinced?

Replies to Questionnaire Sent Out by This Journal to Public Men Express Conviction  
That the Public Will Respond to a Frank and Honest Presentation of  
Facts If Good Service Is Provided and the Companies  
Ask for a Return on Only a Fair Valuation

**E**LECTRIC railways have encountered obstacles in procuring increases in fares to cover increases in expenses. The reasons are many, according to the replies drawn out by the questionnaire which the ELECTRIC RAILWAY JOURNAL recently sent out to more than 400 public service commissioners, mayors, representatives of chambers of commerce and other leaders interested in municipal affairs.

The first article on the subject, published in the issue of Feb. 22, showed that although only about 15 per cent of the total mailing list responded, a fragmentary but striking analysis of public thought on the various questions raised was possible. As shown then in detail, the difficulties experienced by the electric lines were laid generally at the door of lack of public understanding, politics, defects in the regulatory system, and utility sins of omission and commission. The mayors and the representatives of the chambers of commerce urged most strongly the importance of poor service and improper past acts as the controlling factors in the opposition of the public to higher fares.

What, then, should the railways have done? What should they do now? These questions, where the various public representatives had constructive suggestions to make in regard to improving the situation as they saw it, are answered in this second article. So far as the replies can be summarized in a sentence, it seems to be believed that the railways can convince the public of their needs by frankly stating all the facts, subject perhaps to public verification, asking only for a fair return on a reasonable investment and winning the public confidence through efficient and adequate service and a manifest desire to please.

*Would it have been easier for electric railways to procure an adjustment of fares if they had more extensively advertised their increases in expenses and other facts of their situation?*

This leading question definitely raised the issue as to whether or not the publicity work of the electric railways had been carried on with sufficient thoroughness. The predominating opinion was to the contrary, for thirty-two out of the fifty-eight replies expressed the belief that higher fares could have been secured more easily if the publicity had been more extensive. The mayors, however, were evenly divided in their replies, and several others expressed doubt.

In more than a few cases the idea was expressed that the public distrusts the railways and that service needs to be improved. Actions, it was intimated, are more important than words. This tendency of mind was well expressed by the following comment of one civicist:

Advertising would not have been sufficient. It was tried in many quarters and failed even when indorsed by authoritative approval of federal government officials. Public confidence can be gained only slowly and then by a genuine

policy of public co-operation and public discussion and settlement of company affairs.

Other representative opinions by individuals in the various classes follow:

## COMMISSIONERS

Undoubtedly, yes. The more public service companies take the public into their confidence the better for all concerned.

I am of the opinion that such a procedure would have a tendency to offset the effect of the efforts of the designing politician.

I am positive there should have been greater publicity.

Yes. Wherever the companies have taken the public into their confidence as to company affairs, the public attitude has been most notably affected.

Yes, if the advertising was properly conducted—through the medium of committees composed of private citizens. Public officials do not constitute a proper medium.

I do not believe so except in those cases where the company could show an unmistakable record for honest financing.

In some cases, yes—in others, no, because of excessive investment, obsolescence and poor service.

Somewhat perhaps, but not much. Publicity, however, may cause more injury than aid to the cause of proper settlement. Certain efforts have been a mistake. The difficulty is that in most instances the companies in the past have not been particularly careful in building up good-will, so that now there is suspicion of publicity.

Yes. The majority of the public is inclined to be fair if they have full knowledge of the facts and would be willing to grant such increases as were warranted.

If the policy of the railways had been as public in prosperous times as in hard times, there would be far less trouble. I believe the partial advertising during recent hard times has been an injury among some thinking people, as it is often manifestly only part of the truth and not all the truth.

An adjustment of fares would have been more easily obtained had the railways considered the interests of the community in the past and not simply operated in an arbitrary manner without regard to public opinion or necessity.

## MAYORS

It would depend upon where they advertised. Advertising in the newspapers arouses resentment, because the public feels that the company's money should be put in better service and that advertising in the press is only a form of subsidy to secure newspaper support.

Publicity is what is needed and what these utilities have been so reluctant to give in the past. As a result there is a tendency on the part of the public to doubt their sincerity and accuracy.

No. The lack of confidence of the people must first be overcome. Even where all the figures were given, the people think they are "padded."

Yes, and the company should show more freely what part of the increase would go to pay wages, etc., if fares were increased.

Yes. The public must be advised. If not, their officials who allow increases will be discredited and defeated.

## REPRESENTATIVES OF CHAMBERS OF COMMERCE

The public generally discredits such figures.

Yes. They have always, with few exceptions, carried on their affairs in a "Public be damned" way, and the people rose up almost solidly when the opportunity offered and "smote the railways hard." None of them reasoned why but just got even.

That has helped some locally, but so long as the service is not improved the public will complain.



I am firmly convinced that the public of any American city will pay the railway any fare which may be necessary for the maintenance of good service, as soon as that public is convinced that it is not paying dividends on water, and more especially as soon as it is sure that real service is going to be provided. The thought that the American public is unwilling to pay any reasonable price for real goods and real service is bosh. On the other hand, the American public does not forget the place where it bought shoddy. Poor service will never be tolerated. In connection with the matter of service, I am still unconvinced of the impracticability of offering first and second-class service to take care of the varying wishes of the public. This has been a long established custom in foreign countries and might go a long way toward contenting the riding public. I realize that it would mean very considerable changes in the physical plant and equipment to bring this about. On the other hand, I am equally convinced that no intelligent and honest effort has been made to find out what the public wants, acquaint them with the cost of it and then furnish it to them. If there had been, the present deplorable condition could not have developed.

Yes. A comprehensive campaign of advertising should have been started years ago to take the public into the confidence of the carriers.

Yes, if the railways dealt fairly with the public and honestly gave information the public is entitled to receive. It appears like a case of camouflage of expenses.

The local company has done this extensively and the public is well aware of the company's claim, but I have heard no offer on the part of the company to submit to an examination of its books by an impartial expert accountant in behalf of the city, and consequently the public is somewhat skeptical as to whether the claims are justified.

If the roads could prove conclusively to the public that they are capitalized upon a fair basis, that the increased cost of operation was out of relation to the income and that in the future the cost of transportation would be reduced as expenses decreased, the general public would look more favorably upon the necessary increase at this time.

No. These facts were fairly well understood, but the public did not feel the problem to be vital. It felt that the question was one of how much profit went to the railways rather than—as it really was—one of life or death to them.

#### CIVICISTS

Most unlikely. The public suspects the statements are at best half-truths.

Yes. But the need is deeper than indicated. The nature of the normal expenses must be understood before the significance of the increases become impressive.

*What fundamental facts should be presented to the public in order to convince it that increases in fares are necessary?*

In order to secure suggestions as to how the character of electric railway publicity work might be improved, the foregoing question was asked. The answers tended to show the importance of giving explicit data in regard to the investment, operating expenses, increases in cost and the rate of return. The need of frankness and complete truthfulness was emphasized.

One mayor doubted that any facts can be successfully presented to convince the public in its present state of distrust, but other public men suggested that electric railway publicity give information such as follows:

#### COMMISSIONERS

The assurance through adequate legislative measures in special settlements, that the rights of the public will be properly safeguarded while at the same time justice is done to the companies. The past ill-will, unfortunately, cannot be forgotten or entirely overlooked in the present emergency.

A simple statement showing the increased cost of every article entering into operation and maintenance.

That there has been economic and efficient management, and that, in spite of these, revenues have not been sufficient.

A plain statement of expenses and a comparison with the expenses of former years.

An honest and sufficiently subdivided investment account capable of some checking. An honest and sufficiently subdivided operating cost account for say five years. An honest

and sufficiently subdivided revenue account for all railway sources for five years. An honest and sufficiently subdivided cost of obtaining money to finance dividends and interest paid, and the necessary margin between revenue and operating costs to recompense investors.

Money invested, cost of giving service, adequate funds for maintenance and depreciation, disposition to give the best service under the conditions, proper treatment of the public by agents of the company and reasonable return for money invested.

First, that service cannot be maintained unless a fare increase is granted; second, that a financially embarrassed transportation system is a serious handicap to any community; third, that the financial integrity of a company must be retained, or bankruptcy and arbitrary fares will be forced upon the public.

The cost of the properties; operating and fixed charges and the net, expressed in percentage on the cost with an invitation or suggestion that the operating company urges verification.

Actual capital invested and reasonable rate of return; depreciation, operating expenses, etc., and actual return—and the fact that the money would earn more if invested in other enterprises.

Frank statement of income and operating and other expenses. A statement showing that service will have to be suspended unless relief is obtained.

The actual items of cost and especially a showing that the capitalization is proper and that fixed charges are just.

An honest valuation of the properties and a frank statement in detail of costs and earnings.

That the increase is actually needed in the operation and maintenance of the property and is not to be used to pay increased dividends; that bond interest and dividends will be paid only on a reasonably fair value of the property. This last is the more important.

Amount of owners' capital invested from the beginning, and the return paid thereon. Annual surplus above a reasonable return. Cost of annual maintenance. Increases in current costs.

A manifest desire to make the public a partner in the enterprise. Something on the order of the Chicago plan by which excessive investment or obsolescence can be written off and state or municipalities encouraged to participate in the cost of additions and betterments.

#### MAYORS

The real value of the property on which a fair return is to be earned; the amount that should be set aside for the proper upkeep of the property, operating expenses and taxes.

A frank statement of income, operating expenses, rate of return on investment and any other information to which the public is reasonably entitled.

A simple statement of receipts and expenditures.

First, comparison between the value of a 5-cent street car ride to the public and 5 cents worth of other commodities; second, increase in length of ride, speed of travel, and quality of service, with no change in rate of fare; third, increase in operating costs; fourth, increase in efficiency of operation with no prospect of further reduction in operating expenses.

The actual investment honestly and prudently made.

The decreased value of the nickel, and actual costs of operation.

The increases in labor and materials are a sound basis to prove that fixed charges represent a fair return on tangible equipment now in operation.

#### REPRESENTATIVES OF CHAMBERS OF COMMERCE

An honest, concise, easily understood statement of earnings and costs by honest officials. Almost every statement issued appears cunning or the figures are so complicated that the crank in every community can pick them to pieces and make out a plausible case against the company.

I should emphasize the increase in wages as ordered by the government, and also the increase in cost of materials, taxes, etc. Wages in particular show that the money goes into local pockets.

Percentage of profit in past, increase of expenses at present, relation between expense and income, and salaries paid executives of companies.

Increased expenses, dwindling revenue and its causes. Any conditions operating to interfere with good service.

First, an honest valuation of the company's property; second, a full disclosure of the company's business opera-



tions, involving frequent complete examination and audit of its books by accountants employed by the city; third, an agreement by the company to submit to regulation and control by the city under a service-at-cost franchise.

The actual physical value of the property, the actual cost of operation and the rate of return, together with all other necessary facts.

First, the actual cost or investment in property regardless of securities outstanding; second, detailed operating expenses so as to show that no funds have been misappropriated, and that no abnormal salaries are being paid; third, the balance insufficient to pay the current rate of interest on the actual cost of the property and allow a reasonable sum for depreciation.

That service cannot be rendered at less than cost, and that cost includes a fair rate of return on the capital necessarily invested for the rendering of the service.

Increased wages necessary for employees; increased cost of rolling stock, supplies, general maintenance; taxes; need of increased facilities for improvements in service.

#### CIVICISTS

Costs of materials and labor; necessity of reserves for repairs and renewals; amortization of superseded property; provision against future obsolescence, and necessity of sufficient operating margins to maintain flow of new capital for betterments.

That all cards are placed upon the table. Whenever there is evidence of bad financing and a situation now existing has been brought about by bad financing, it is almost impossible to convince the public that fare increases are necessary.

That there is no watered stock.

Not facts so much as evidences to deal fairly with the public when the company has the upper hand.

(1) Willingness to readjust franchises so as to permit adequate public participation in benefits of monopoly and control over operating conditions. (2) Constructive and co-operative policy with employees. (3) Publicity of costs and expenses. (4) Limitation of profits. (5) Broadening of stock ownership. (6) Representation on boards of directors of disinterested citizens.

(1) Low rate of capital turn-over and normally small margin of profit. (2) Load factors. (3) Physical impediments to better service. (4) The efforts of the management from day to day to make adjustments for the betterment of the service should be advertised. (5) Traffic checks. (6) The service problem in general.

Distinction between revenues from transportation, electric light, power or other sources. Proof that higher fares increase net revenue adequately to justify their imposition on the community. The proposed increases are normally arbitrary, representing no more thought on the part of the company than is given by the public.

*Do you believe that the resistance to higher fares comes from people who understand what is meant by fair value, fair return, operating expenses, maintenance and depreciation?*

That the opposition to higher fares does not come from the so-called thinking part of the public was the general opinion of those replying to this query, only five answering "Yes." As one commissioner summed up the situation, however, the most determined and radically hostile resistance to higher fares is from the best informed when companies have not lived up to their contracts in the past and have given poor service. Moreover, as a business man pointed out, opposition often comes from men who understand railway economics but represent people who do not. Some replies follow:

#### COMMISSIONERS

Not in the main. I believe the average, thinking person is fair-minded and believes in the policy of live and let live.

Largely, yes. But of course the greater voting population would vote on the basis of their own convenience, comfort or profit.

No, not generally. In some cases opposition to higher fares may be justified.

Doubtless there is much ignorant opposition, but the regulatory bodies are helpless to deal adequately with the

situation. The people who ought to have power and have not, understand the questions of fair value, etc., fairly well.

No, not where higher fare is justified.

Opposition comes from nearly all classes of people. If a man understands "fair return," "depreciation," etc., it only intensifies his opposition if he thinks the company has formerly earned more than a fair return, etc. To the ignorant the large sums involved seem to mean riches anyway. They do not understand the absolutely necessary large margin above operating expense necessary for return on investment.

No, usually from those who do not understand; also from a certain class who are always antagonistic to anything corporate.

#### MAYORS

No, I believe the public is willing to pay a fair return upon fair value, but the public must see that it is getting fair service to be satisfied.

Few electric railway patrons understand these terms, but there has been a great deal of public education along these lines within the last year.

Seventy-five per cent of the resistance is due to ignorance of basic principles of fair value, fair return, operating expenses, etc.

To a considerable extent, but most people do not understand and could not pass upon a financial statement in ordinary form.

#### REPRESENTATIVES OF CHAMBERS OF COMMERCE

I think they all complain when they do not get service, even those who will admit that an increase is justified. I do myself.

Yes. The public has not been informed, so far as I have observed, as to the facts of fundamental costs and maintenance.

There is a well developed and intelligent public opinion in this city. A large number of people grasp the situation in general terms and ask for only a fair deal. They are willing to pay a higher fare if this is justified and shown to be necessary. On the other hand, there is a large group of socialists and their sympathizers, who are satisfied with nothing short of municipal ownership and operation, and want to force the company into bankruptcy so as to buy the property in for the city as cheaply as possible.

I think the public is better informed upon these subjects than is generally believed as the average intelligence is high. The public can be depended upon to act according to the known facts.

No; very few of the company's patrons know what these terms mean.

No. This class of people, however, does not know of the invested capital without an appraisal.

Yes, in part. But the great mass of the public opinion is "against" electric railways without analyzing anything.

#### CIVICISTS

Comparatively few of the general public understand these things. Those who do will probably not oppose the road that has been frank and has a good case.

I do not believe resistance is based upon analytical discrimination but upon a general attitude of hostility and lack of confidence in management.

No. But these are the people who understand the physical problems of furnishing electric railway service. They are sympathetic because they know from their own experience that the other fellow's business is likely to have complications as serious as those in their own.

*Do you believe that it would be possible to overcome the resistance of the objectors by extensive information respecting fair value, fair return, operating expenses, maintenance and depreciation?*

Only five out of the total fifty-eight answered this query negatively, the general reasons being the uncertainty of good results, the cost and public distrust. Thirty replies were affirmative, while several others answered "partly." Six additional affirmative answers had strings attached in that publicity alone was deemed to be ineffective if there was a lack of fairness and of good service. Eleven replies contained the caution that



a part of the public would not be convinced by any means.

The leading answers were as follows:

#### COMMISSIONERS

Very largely—except from the class which does not care what happens to public utilities, if it only happens. Happily that class is restricted.

Such publicity might be in a measure effective, but there are always protestants who do not want to be shown or convinced.

Somewhat; but the company first has to show a willingness to participate in the readjustment instead of letting all concessions fall on the public; and, above all, it has to come in with clean hands as to capitalization and fixed charges.

Such information would overcome all unjust opposition except by the demagogue.

Not unless the public can first be satisfied as to the capitalization of the company. In my opinion, this is a vital step and a prerequisite to any campaign of education.

No, because this engenders contest and uncertainty in the public mind.

Of course, education is proper, but, in my opinion, publicity regarding general policy will serve much better than the discussion of the needs of a particular company.

If the public is fully informed, it will be inclined to do what is fair. There will always be some whose minds are closed against any presentation.

Yes, if completely presented—for several years back and with a demonstration that public utility investment and revenue are on a radically different basis from those of a grocery store, factory or department store, where the turnover is two, three or more times a year as compared with 20 to 40 per cent for utilities.

The more reliable and trustworthy the information, the less resistance will be made.

#### MAYORS

Where the company has given poor service for some years, the public will be satisfied only with a change in management, because the public will reason that more money paid to a management that has failed when the returns were ample will not assure any better success in the future.

Not all objectors can be convinced, of course, but in general the public has shown a disposition to be fair with the companies when the situation was fully explained.

No. The advertising cost would be prohibitive and the results problematical. The answer of the public now is: "Let the city take over the company."

All resistance can thus be overcome except such as is due to prejudice and bitterness from the past.

Yes, if the company could show upon a fair basis that it needed the increase.

Yes, to a large extent, if facts are made plain. Most people want to be fair.

Yes, if the utilities could show fair value.

#### REPRESENTATIVES OF CHAMBERS OF COMMERCE

Maybe—and a new generation.

Yes, if the information is given in an understandable way. In other words, elementary education is needed.

Such information alone would not be sufficient so long as the service was inadequate. Under good conditions it would be of great value. Most of us are reasonable beings.

Yes, but it is hard to get a respectful hearing from the great mass of voters. They are unthinkingly opposed to privately-owned public utilities and do not want to be convinced.

Yes, largely, if the diffusing of this information was begun prior to the establishment of the deep-seated prejudices that now exist.

Yes, if the company makes an honest effort to practice sound economics.

Further information would be necessary along the lines of future intentions and requirements of the company toward the public.

No. The average statements are one sided and do not merit confidence as a rule.

It would thus be possible to rob professional agitators of much of their thunder.

#### CIVICISTS

Possibly, but such education is probably possible only with local leaders of thought indirectly affecting public sentiment.

Perhaps, but not if the financial history of the company is bad.

To some degree, but this is not the main point.

Positively, yes. Let the industry—nationally and locally—employ up-to-date merchandising methods and it will "sell" itself readily to the public, at the same time eliminating latent defects in its goods.

Yes, if accompanied by a proposal for a unification of transportation facilities, steam and electric, urban and interurban, trolley and jitney, and a strategic disposition of the services which would insure the upbuilding of the community and its increasing prosperity.

*What selling points occur to you as making the strongest appeal to the public in an effort on the part of electric railways to increase fares?*

In the opinion of one commissioner, the service of a public utility, which has a monopoly, does not "sell" in the sense that the product of a private commercial enterprise is sold, and "selling points," in the ordinary commercial sense, should not be emphasized. The other public representatives, however, in general recognized the usefulness of merchandising principles between the electric lines and the public, and they were frank to point out what sort of sales talk would be most effective in putting across the idea of a higher fare.

The general tenor of the replies was that nothing counts for more than do facts, presented with frankness and honesty, and an effort to give efficient and adequate service. Other detailed suggestions were made, as can best be seen from the following specimen replies:

#### COMMISSIONERS

"Can you, property owners and residents of Red Gap, dispense with your electric lines? Is it worth while to YOU to have them operated efficiently? Can their continuance be expected, can good service be rendered, unless their owners are fairly compensated? Think it over. Let's be fair with each other," etc. In brief, an appeal for a square deal supported by facts.

Increases in the wages of employees constitute the strongest selling point. The public is willing to pay a fair and just rate if it believes the wage earners are being treated fairly and the additional revenue is needed for this purpose and not for increased dividends.

The actual facts plus a showing of willingness on part of the company to share the burdens of readjustment plus a civic attitude plus an effort to give service.

Clean cars, prompt service, obliging and courteous employees.

The fair cost of rendering service and the increase of cost attending the furnishing of more service—the cost of more men, more cars and more power to provide adequate capacity to handle "peak loads" of traffic.

Complete accounting, proper service, essentiality to the community, frank and specific acknowledgment of obligations to the public, and recognition of right of employees to bargain collectively.

The adoption of an operating and financial policy in which the public is represented and has a voice.

The value of the service to the patrons: dispatch, commercial reliability and efficiency. A railway should seek no increases which are not justifiable, and it should make the service efficient.

Decrease in business, especially to pleasure resorts, by reason of the advent of the automobile.

The sum totals of wages, salaries, fuel and supplies, taxes and insurance, miscellaneous expenses (detailed somewhat) for several years, and maintenance; revenues, number of cars operated, number of paying passengers carried for some years; all expenditures for additions, etc., by years.

(1) Service; (2) extensions; (3) improvement in equipment, and (4) a promise that a return to the old schedule, or even a better rate, will be favored when conditions warrant.

#### MAYORS

The strongest selling point is that the increased fare is adequate to maintain adequate service. The excuse for the existence of electric railway lines is the furnishing of service



rather than the earning of profits. When the company-created "fetich" of the nickel is eliminated from the public's mind, it will be willing to pay a reasonable price for good service, but it will still be very suspicious that the old adage will still prevail: "When the devil was sick, the devil a monk would be; when the devil got well, a devil a monk was he!"

There are two classes of citizens on this proposition—the ones who would respond to the "fair value, fair return" argument, and those who distrust the company and will listen to none. I can think of no "selling points" except perhaps a nation-wide movement to readjustment franchises so as to give more city control and profit sharing.

The wages formerly paid and those now paid under the recent order.

The actual necessities—upon the basis of fair value under competent management.

#### REPRESENTATIVES OF CHAMBERS OF COMMERCE

Safety, speed, comfort and convenience.

Principally the truth, something most companies know nothing about. Most companies would gain half the battle if the management were changed. The people will not believe the men who have fooled them for years.

I should use a comparison of the increases in the cost or various foods, clothing and other everyday necessities as compared with the cost of riding on the electric lines. I would also compare present costs of operation with costs of five years ago.

If the railways can convince the riding public that they are trying to inject into the conduct of their business some of the same desire to please that Israel Braunstein manifests when he wants to sell a second-hand suit of clothes, the problem will be solved and their proposition will be sold. The trouble is that during the past indefinite number of years (when the electric railway sun was shining) the companies did not take the public into their confidence, and now that they are in distress, the dear public is not easy to woo.

Better equipment and reliable and more adequate service.

Laying all their cards on the table, and giving good service even at a temporary loss.

Absolutely honest statements backed up with facts that can be clearly proved, and the general necessity of the electric roads to the welfare of the community.

Frankness and fairness.

The most effective selling point is an understanding on the part of the public that low fares mean inferior service.

Better service in every phase; need of revenue to pay better wages and obtain higher types of employees; need of better rolling stock and general equipment; need of paying fair return on its investment.

Public necessity of good service, including convenience schedules, good cars, etc.

The fact that the welfare of the railways is closely linked with the business prosperity of the community.

#### CIVICISTS

The fact that prosperity of the road with reasonable margin of profit is essential to maintenance of service and future extensions thereof.

The need for good transportation as being the arterial system of a city and fundamental to its growth and progress.

The offering to cities a chance to run their own railways, which might convince them that it costs money to run a public utility.

The imagination of the public must be kindled. Here is a great money-making (for the public), pleasure-dispensing, health-giving, home-creating institution which with co-operation can be made to double and treble its dividends (to the public) of profits, pleasure, health, homes, etc. Tell the public that the company is an instrument to be used, and that it should be aided. If a friendly atmosphere is created, a fare increase will come whenever needed.

The best selling point is a guarantee of adequate maintenance and depreciation, with a provision for a fund to provide for municipal ownership without any joker such as was imposed in Chicago.

The third and last article dealing with the replies to the questionnaire sent out by this journal will cover questions concerning guarantee of return, public ownership and similar fundamental points. This will be published in a later issue.

## Program for the Mid-Year Meeting on March 14

THE mid-year meeting and banquet of the American Electric Railway Association will be held in New York City on Friday, March 14. The technical sessions will be held in the Engineering Societies' Building, 29 West Thirty-ninth Street, beginning at 10 a.m. The program appears below.

### [ 1 ]

#### Report of Committee on Readjustment

By P. H. GADSDEN, Chairman.

#### Discussion of Report:

##### (a) Valuation

By P. J. KEALY, President Kansas City Railways, and H. H. CROWELL, Vice-President Michigan Railway.

##### (b) Rate of Return

By EDWIN GRUHL, Assistant to President, North American Company.

##### (c) Maintenance and Renewal Reserves

By A. L. DRUM, A. L. Drum and Company, Chicago.

### [ 2 ]

#### The State of the Industry

##### (a) Modern Regulatory Plans and Theories

By A. MERRITT TAYLOR, President, Philadelphia & West Chester Traction Company.

##### (b) Capital and Electric Railways

By FRANCIS H. SISSON, Vice-President, Guaranty Trust Company of New York.

##### (c) From the Regulatory Viewpoint

By HON. WILLIAM D. B. AINEY, Chairman Public Service Commission, of the Commonwealth of Pennsylvania, and HON. CHARLES E. ELMQUIST, President National Association of Railway & Utility Commissioners.

THE annual banquet will be held in the evening at the Waldorf-Astoria Hotel. The speakers will be President J. H. Pardee of the Association, Hon. Warren G. Harding, United States Senator from Ohio; Hon. Lindley M. Garrison, former Secretary of War and now receiver of the Brooklyn Rapid Transit System, and B. A. Hegeman, Jr., representing the manufacturer members of the Association.

A special invitation is extended to the ladies to listen to the speaking in the evening. Mrs. Pardee, assisted by a committee of ladies, will act as hostess. A dinner for the ladies will be served in a separate room, but when the speaking begins the ladies will occupy the boxes in the galleries of the main banquet room so that they may hear the addresses. After the conclusion of the addresses there will be dancing in the Astor Gallery. A committee, with N. M. Garland as chairman, has been appointed to look after the comfort and convenience of the lady guests.



# Ethical Aspects of the Situation\*

The Writer Analyzes the Causes of the Fare Trouble and Suggests Remedies—He Believes That the Fallacy of a Fixed Fare Has Won Widespread Recognition and Believes the Railways Are "At the Dawn of a Better Day"

By R. T. SULLIVAN

General Manager, Mahoning & Shenango Railway & Light Company,  
Youngstown, Ohio

**W**HY are electric railway companies so generally hated and distrusted?

That is a question that is constantly recurrent to the minds of all of us who are engaged in electric railway transportation. Furthermore, it must be admitted, the question fairly states the case, for the first impulse of the public, with few exceptions, is to oppose all things that the street railway company purposes doing, to look behind any given situation for an ulterior and sinister motive. Too often this first impulse becomes a lasting belief, and not only are the development and efficiency of the railway system seriously affected, but the very growth of the community concerned is retarded. Generally, the interurban systems find themselves in better case than do those of the cities. Nevertheless, the finger of suspicion is pointed at them in the same manner, though less frequently, perhaps, and, in principle, what may be said of the city transportation systems may be applied equally to the railways devoted to transporting the people from one community to another. This is not a new question. In fact, it is older than many of us are in the business to which it applies. But it comes to us with peculiar force and insistence at this time because of the griefs and worries—yes, even business tragedies—through which we have passed in the last year and because of the serious situation confronting us of the transportation industry now at the dawn of the world's reconstruction period.

## LESSONS TAUGHT BY THE WAR

The lessons of the war are for the electric railway industry as for all other enterprise, and several of them have a direct bearing upon the theme of our discussion to-day:

1. It has been more thoroughly demonstrated than ever before that the electric railways of the country are a vital industry—that any failure on their part to function properly is a serious retardation of the industrial and commercial life of the nation.

2. The crust has been cracked on the hoary illusion that a street car ride should be had for a fixed sum—for a nickel—despite the length of the ride, the conditions under which it is given, or the cost of giving it.

3. Public trust and community co-operation are

essential to the proper and efficient development of local transportation systems.

The national government early in the war recognized the vital nature of our business, and the President and others stressed the fact that adequate development of the industrial resources of the country for the purposes of making war rested largely on our humble street cars. Whether the government should have gone farther and should have taken over the control of the electric lines as well as the steam roads it is futile to discuss now. Perhaps, since, as the English say, we

have "muddled through" the war period somehow, and since we know not whither government control of the steam roads may be drifting, we should be content that things are as they are.

Our towns and cities also came to a somewhat tardy but general realization of the vital nature of the street railway industry, and many and insistent were the demands for service and more service to carry industrial workers to plants engaged in essential war work. Whether such service was

possible or wholly impossible mattered little to those making the insistent demands.

Shall we let this popular recognition of our problems drop where it was when the armistice was signed? Electric railways are just as important to commercial development and community growth as they are to the mobilization of the nation's man-power for war-making output. Should we not then exert our very best efforts to solidify and increase this recognition of the railways' vital character to the end that it may bring to us constructive consideration as an offset to destructive criticism?

## NECESSITY FOR FLEXIBLE FARE RECOGNIZED

As to the widespread recognition that has been won for the fact that the nickel is not some potent talisman that will produce a street car ride for the possessor in any and all circumstances, probably there has been no other such important development in the electric railway world in many years. A recent survey showed that in 348 cities increases in street car fares had been made. In this list all excepting six of the forty-eight states were represented. The urban population of the United States is estimated to be approximately 43,000,000, of which 23,000,000, or something more than half, are paying increased fares.

That is an imposing array. It justifies the assertion

**T**HE most important development in the street railway world in many years is the present widespread recognition of the fact that the nickel is not a potent talisman that will produce a street car ride for the possessor in any and all circumstances.

\*Abstract of paper presented at annual meeting of Central Electric Railway Association, Cleveland, Feb. 27, 1919.



that the fallacy of a fixed and unaltered fare has won widespread recognition. But the points of particular interest to our discussion are that in many places it is recognition of a war emergency only and not an admission that the costs and prices of the electric railways vary and should vary in accordance with economic conditions; and further that it has required untold work and argument to bring the belated and grudging assent to increased fares.

The fact remains that there are many thousands of persons to-day who concede that electric railways are affected by increased costs in the same manner as the merchant and the manufacturer and should be allowed to advance their prices for rides, but who, two years ago, would have smiled in derision at the mere thought of such a thing. That is a distinct gain. It is the application by outside observers in large numbers of ordinary business sense to an enterprise which was not before accorded that business logic. Is it not then an opening through which we can win further and more lasting application of ordinary business rules to our affairs? Is it not a companion piece to the recognition of the vital nature of our industry to be developed in like manner?

#### PUBLIC TRUST MUST BE WON

Then that third lesson of the strenuous times which have passed but from which we shall be a long time recovering—the need of public trust and community co-operation. Why are electric railway companies so generally hated and distrusted? What remedies can be applied to overcome or mitigate this feeling? Usually the first thing that pops into mind is that the electric railway is “a woman with a past.” “The public be damned” policies of former years are sometimes referred to with a wave of the hand as if this somewhat nebulous statement was final and conclusive, or the “watered stock” bugaboo is trotted forth with a flourish.

I am not going to assert that these charges of past misdeeds are groundless, but I do believe that frequently they are too readily acceded to by electric railway men, whether the shoe fits or not. Certainly they are imbedded in the popular mind whether or not they have application to the property that may be under consideration. Roseate dreams of the pioneers in electric railway work which led them to assume that everything over and above operating expenses was profit without regard to the wearing out of the property and the tremendous rapidity with which the industry developed certainly have given color to popular ideas of huge profits and stock juggling, as have mergers and combinations, some malodorous and some purely on a business basis. But the fact remains that there are many properties in this country that have no actual taint of the past clinging to them, and it is a further fact that supervision of corporate activities by state regulatory bodies for some years has amply safeguarded the people against such abuses on the greater number of properties, if not on all.

Nevertheless these popular beliefs have come down to all of us, pretty much alike, and with them have come a variety of ills, such as extraordinary taxation, paving requirements, street cleaning and sprinkling obligations, bridge maintenance and the like, all mani-

festing the effort of the people through their local governing bodies to get back a part of the money paid for car rides, all based on the thought that the profits of the business of transporting the people through the streets were too great to be fair.

Public regulatory supervision over fares and service has not removed these burdens, nor have time and drastic legislation surrounding the issues of bonds and stocks done away with the suspicion and distrust.

Then what shall we do in this situation? For one thing I believe we should not be so ready to plead guilty for our predecessors to uncommitted sins of the past, and I believe that we should combat with the logic of graphic figures new and old impositions on the pockets of the street car riders. So many new cars balanced against a certain number of miles of street paving will have a strong appeal to most car riders. They use the cars, but the paving is for automobiles and other vehicles. Then, too, the steady presentation of the cost of the improvements and replacements to the public as opportunity offers, showing what becomes of the money the car rider pays and how new capital is used, certainly will help gradually to wear away some of the old mistrust and suspicion as to where the money goes.

You have done these things, you say. Well, the suggestion is not offered as a novelty. Keep on doing them and do them more consistently. This distrust of financial methods has been a long time growing, and it will require time to wear it away.

#### INHERENT HANDICAPS IN METHODS OF FINANCING

Then undoubtedly much of the antipathy of the ordinary individual to the electric railway company is due to the fact that every such corporation is the embodiment of capital—that capital which so seldom presents itself to the mind of the “man on the street” in its true aspect of the conglomerate of the savings of the multitude, but always as the ogre of untold wealth gathered into the hands of the few—that capital which he has been taught to despise by the office-seeker and the muckraker.

Unfortunately there are inherent in the public utility business several factors which encourage this attitude of mind and frequently lead to the allegations of “outside ownership” in a manner which, to say the least, is damning with faint praise. These factors include the means of financing to which a public utility usually is compelled. A mercantile establishment is ordinarily looked upon as a local enterprise, made so by the use of a local name regardless of where the stock is held, and an industry, if not largely owned where it is located, at least has its chief touch with the people of the community by affording employment to a large number of them, and it sells to them little or nothing directly. Thus both the manufacturer and the merchant have local favor while the street railway, or other utility, usually has its stock and bonds widely held while it is gaining its sustenance from the local field.

Again, the industrial and mercantile enterprises, with their turnover of capital at the rate of from two to six or more times a year, frequently can finance improvements or additions out of surplus, while the utility, with its turnover of capital only once in



four, five or six years, and the heavy demands on it for extensions and new capital expenditures, must always and with great frequency raise the needed amounts by new issues of stocks or bonds. Both because of the volume and usually low dividend-paying qualities of these securities, the local money supply in most instances is not sufficient to absorb them and, like the municipal bonds, they have to seek the money where it is—New York or some other money center.

This gives rise to the condition of so-called "outside ownership" and the feeling on the part of the people as a whole that the only interest the utility has in the community is to get as much as possible out of it.

#### HOW TO CARE FOR THIS SITUATION

Two thoughts suggest themselves as means of meeting this situation, in part at least. One is care in making public full financial statements, and the other is consistent effort to secure the greatest possible number of local stockholders. To be sure, the freedom with which the financial statements of a company may be spread broadcast is a question to be answered in the light of each company's situation, but usually there is too great timidity in offering these salient facts concerning the corporation for the scrutiny of the public. Certainly, where the facts are open to all, the financial affairs of the company lose much of their mystery and less frequently are the basis for attack.

As to the sale of securities to the local investor, small or large, certainly this seems logical and correct in principle. How far this is possible for railway companies in the present condition of affairs is a problem, but combined properties and electric light and power companies have found that the results of the local sale of their preferred stocks have been excellent, not only as a logical method of financing, but as one of the best means of reaching a solid basis of understanding with the people they serve.

#### TWO CAUSES FOR DISTRUST OF UTILITIES

But the genuine cases of scandal involving street railways, of maladministration of the properties and of "stock manipulation" have not been so general or so frequent as to account entirely for the prevalence of the suspicion and distrust directed against the transportation utilities. Other elements are involved, one of which is the practice of candidates for political office to a greater degree than twenty-five years ago to talk directly to the public, and the extent to which demagogues in such talks denounce corporate wealth, often selecting the local railway as a butt for their denunciations, irrespective of the facts.

A companion to this political form of attack is "muckraking." The original muckraking, which was founded upon careful investigation and a conscientious effort to present the facts, has done its quota of good; but magazine muckraking begot that more modern form of

scandal mongering which is termed "yellow journalism" and though, fortunately, the "yellow journal" is much in the minority among the newspapers of the land, its effect has been widespread. Together with the condemnation of business corporate so freely dispensed from the political rostrum, it has gradually brought into being what might be termed a distinct type of news writing, a type that gives precedence to the flashy, though unimportant detail, over the important, but solid, substance.

#### RELATIONS WITH NEWSPAPERS

I am firm in my belief that the newspapers as a whole do not get nearly so much credit as they deserve for the earnest efforts made to present facts correctly to their readers. Nevertheless there is hardly a newspaper, especially in the smaller cities and towns, no matter how carefully edited or conscientiously directed, which does not have to depend in the hurly-burly of getting to press on time not only upon the veracity but on the judgment of comparatively young, irresponsible and uninformed reporters. Thus many ill-considered items are printed and much unintentional misrepresentation results. Perhaps others might dispute the assertion, but I doubt whether any form of business suffers so frequently or so keenly from this type of news as the traction company. And not even the long-range "horror gun" of the Hun could hurl a denial or correction far enough to overtake the evil thus inflicted.

Then what are the street railways to do to offset or prevent this unfair criticism in politics and in the ordinary channels for public information? Certainly here is a field for thoughtful, well-considered and persistent publicity. All that is printed is not publicity, and the value of publicity is not to be measured solely by its volume. Self-congratulatory statements that smack loudly of the press agent simply clutter up the galleys of the newspaper composing room, or the waste basket. They do little good if they are printed. But honest-to-goodness facts about the local electric railway business will help materially to meet the situation.

In the first place, much of the criticism hurled at the railways by the small office seeker is not based upon any fundamental idea that he really knows whereof he speaks. It is usually a very general accusation, sometimes coupled with the statement that the facts are hidden and cannot bear the light of day. If the facts concerning the company, its service and its business are already in the possession of the people, much of the ground is swept from under the feet of such assailants, and even if they are not adduced till after the charge has been made they often will stop the repetition of the canard or offset some of the evil that it has done. Uninformed critics do not like to face facts.

As to the common troubles of incorrect statements in the newspapers, the situation is somewhat easier.

**I**N the conduct of our business we are denied the usual methods of the merchant and the clerks who are his points of contact with his patrons in making the purchase of our commodity a pleasant incident. Yet ours is a selling business—the selling of rides—and the closer we can approximate mercantile methods the smoother will become our contact with the people whom we serve.



In the great majority of cases where a misstatement is printed the reason for it is that the writer of the item did not have the facts and did not have initiative enough to dig for them. If a consistent effort is made to supply the facts, the chances are strongly in favor of them being used by any reputable newspaper. If something happens or is impending, try to beat the misstatement into print with the facts—do the reporter's digging for him and usually he will appreciate it. Sometimes you will be too late, but try again and keep on trying, and after the reporters get to know that the facts are available for them they will come after them or wait for them before breaking into print. But beware of discolored facts, for as surely as a burned child avoids fire so will a reporter who has once been misled look askance at any information coming from the same source again.

As to whether your facts should be placed before the people in news items, in paid advertisements or in pamphlets in the cars depends upon circumstances. The one thing of which I feel confident is that if the public is not to be misled by false or incorrect statements they must be supplied with the truth and the facts. To wait till the storm breaks is a bit tardy to think of repairing the roof, and so it is unfortunate if you cannot see your way clear to a consistent policy of publicity till you find yourself in a tight place.

#### HOW TO MAKE THE PEOPLE BELIEVE

It is just as well, also, to endeavor to give a human, natural tone to the utterances that go to the people, whether they be advertisements or comments for the news columns. At an electric railway convention a commanding figure in the industry complained with regard to publicity that "the people will not believe us." Now stop a minute and analyze that.

People do not ordinarily accept anything as the embodiment of the whole truth. Assuredly they will accept as true something stated as a fact in which they may not be greatly interested and which is not of a controversial nature, but if we expect them to accept as the last word a statement issued in the somewhat stilted form that usually marks the official statement handed out at a time of difficulty, or when something is wanted, we are more credulous than we have any reasonable right to expect them to be. On the other hand, if they are accustomed, when things are going right and nothing is needed or wanted, to hear from that same source in a natural, human way, then we may expect a number of them to believe all that we have to say and a still larger number to believe the greater part of our statements.

This is all the truer if we endeavor to be persons rather than figureheads, if we are known to the people with whom we do business in some other capacity than that of president, manager, or superintendent of the electric railway company. A real, vivid interest and activity in community affairs wholly detached from the transportation of the people not only is wholesome for us as men but gives us a personality that does much toward offsetting the impersonal nature of our work, in so far as it affects the car rider.

Nor can this be made, so to speak, a "one-man job" for the organization. Rather every man who is capable

of representing the company with the proper spirit should be encouraged to take a part in the various and varying interests exemplified in the social and business organizations of every town. It is quite probable that some might not enter with enthusiasm into a "hot dog" supper of the Twenty-ninth Ward Social Club, or the bowling tournament of an athletic club, or again be interested in the technical discussions of an engineering society. Yet there is someone in every organization of any size who does have a real interest in about every type of activity that a worth-while organization will promote, and if such interest is encouraged, then the company has a way opened for it, in time of need, to reach receptive and friendly minds in about every group in the community where public opinion is molded. Furthermore these employees will be efficient representatives of the company at all times in casually winning consideration for the railway's plans and motives if they are kept well informed through the medium of company clubs, periodical bulletins or the like.

Our actual business contacts with the people are almost exclusively through the medium of ticket sellers, ticket takers at prepaid areas and the motormen and conductors on the cars. With very few exceptions they are not under anything like constant supervision of those who have a broad conception of the service we are selling to the riders. Thus we are denied the usual methods of the merchant and the clerks who are his points of contact in making the purchase of our commodity a pleasant incident. Yet ours is a selling business—the selling of rides—and the closer we can approximate mercantile methods the smoother will become our contact with the people whom we serve. So-called "welfare" work among employees, the methods of conducting schools for motormen and conductors and the like would in themselves furnish the subject matter for prolonged discussion. Yet it is in activities like these that we may find the answer to the very knotty problem presented by our widely scattered points of contact.

#### TWO OTHER POINTS TO OVERCOME

Closely allied, in so far as it affects the public attitude, with the undesirable nature of our points of contact are two other factors in making the people so generally hate us and distrust us. One is, of course, that the economical transportation of the people in any given community is a natural monopoly, and the other is the diametrically opposite views that must be taken by the rider and the company of what constitutes good service. Our customer is buying an individual ride. The service is either good or it is "rotten," to his way of thinking, in accordance with whether he can board a car at the time he chooses to ride and be carried to his destination in a fair degree of comfort, with expedition and without delay. Though he is buying an individual ride, we are selling a general service. We cannot think of each individual as such. We must pay strict attention to the best possible service for the greatest number. Hence, perhaps, a transfer of passengers from one car to another short of their destination, or some other untoward happening that results in discommoding a few for the benefit of many. The many for whom we may take this step in operation don't know it and don't



care, but you are mighty certain to hear from the few who were inconvenienced.

In this case of the individual ride against the general service, one of the most powerful things in swinging the jury of public opinion against the railway company is the "rush hour." Naturally there are thousands of persons in any fairly large community who do most of their street car riding in the morning and evening during the peak-load periods. Just as naturally their opinion of the quality of the service given throughout the twenty-four hours of the day is based upon these two short periods when they do most of their riding. Holiday crowds or pleasure seekers rarely "kick" about crowded cars, but men and women going to and from their work day after day in similar crowded cars are bound to become a bit nasty about it.

#### SOME THINGS THAT CAN BE DONE

But what are we to do about these matters? How can we ameliorate these conditions and how can we overcome the prejudices founded upon them?

Frank and well-considered publicity telling the facts about the service, newspaper advertising and advertising in the cars for the same purpose and occasional talks on railway problems before civic bodies will help. In some cities it has been possible to gain the co-operation of employers of large numbers of persons through the staggering of the hours of employment so that the peak loads may be flattened out. Where this has been done it has proved beneficial.

There also has come in for wide consideration and for adoption in a number of cities comparatively recently what is commonly known as the "service-at-cost" franchise. Under this plan the rider knows that the amount he must pay for his ride is dependent upon the cost of the service. He knows that the cost of the service is largely in proportion to the amount and quality of service. Whether there shall be more service at a higher rate or less service at a lower rate becomes virtually his own problem. Under a fixed fare the company may sweat blood to get by without it being in the least a matter of concern for the rider. He may growl about the service as much as he pleases, it costs him nothing. Under an automatically flexible fare he does have a direct interest—in a sense he is a partner—and his own interests curb his passion for unlimited service when he realizes that he will have to do his part toward footing the bill.

#### DON'T BOTHER THE PASSENGER TOO MUCH

In this same regard there is another matter which I am going to advance somewhat timorously for your consideration. It is almost axiomatic that the easier a person is parted from his money the less likely he is to object, and the more complicated the transaction of paying for what he gets the more certain is he to object to paying. If that means anything to us it is that the

simpler and easier we make the matter of paying street car fares, the more convenient and comfortable we make the access to our cars and the passenger's progress to the point of parting with his money, the less likely are we to hear complaints both about the amount of the fare and the quality of the service.

Is it not true that sometimes when we seek to make sure that we are receiving all that is properly coming to us we make the process of paying fares too complicated to permit of the passenger parting pleasantly and easily with his money so that he will be pleased with the purchase of a ride? The passenger's part in the transaction should be fully developed and considered when a new method of collection or of checking loads is planned, and frequent changes in methods of fare collection and the like should be avoided. True, in time people become accustomed to almost anything, but the oftener the manner of paying is changed, the oftener the amount of the payment is brought actively to the mind of the car-rider and the oftener the question arises why anything at all should be paid.

**T**HERE is reason for optimism. We are at the dawn of a better day. True, the months that have passed have left some casualties along the way. That is the havoc of war, let us say, but we who have come through, somehow, must keep our faces to the front like good soldiers and win out for an industry that is just as vital to our country in peace as in war.

There is still another form of clamor against the railway company with which we all are acquainted. This is the insistence upon extensions of the railways into sections of a city about to be plotted into building lots and placed on the market. There was a time, in the days of perpetual franchises, when the idea of building lines for the future possible profit might be viewed with a degree of equanimity, but that is not true in these days of short-time franchises and high costs of construction and operation. Yet the thought is deeply imbedded in the popular mind that there is

bound to be a large profit in a street railway whether anybody rides or not, and there are always glowing estimates of the rapidity with which traffic will build up in this new section—estimates, it goes without saying, that are seldom borne out in the experience of traffic checkers.

Perhaps here, too, if it is fair and equitable otherwise, the service-at-cost plan may be helpful, for it will identify the people's own interests directly with those of the company in the economy and efficiency of electric railway operation. Another plan that sometimes is helpful is to take the matter up with the real estate developers upon a co-operative basis. In some instances where the enterprise has been sound and of sufficient magnitude the developers have consented to pay the construction cost upon the agreement of the company to operate the line, or have guaranteed the operating costs for a period of years sufficient to permit of the building up of a fair amount of traffic. Such co-operative effort is sound policy as it distributes the burden of cost and places a part of it where it belongs—upon those who will be immediately and directly benefited by the improvement.

One more suggestion in this effort to consider some of the aspects of our business for which we are seeking



remedial measures. Is it not a fact that much of the difficulty of the electric railways in placing themselves upon a better basis of understanding with the communities they serve is due in large measure to the lack of a definite and continuous policy? Is this not equally true of the average individual company and of the industry as a whole?

Many of the problems with which we are wrestling exist because someone who has preceded us did not have the vision to see, or else he cared little, what would be the effect of his actions upon a situation that probably or certainly would arise in after years. Likewise the contracts and agreements and promises into which we enter to-day are going to have their future effect on the affairs of the properties we manage, and we should give careful thought to the years to come so that we may be doing as little as possible for some present benefit that will inflict future and perhaps permanent injury.

Now is a good time to consider this phase of our business. Never before has such a large part of the people we serve realized either the importance to them or the difficulty to the company of the carrying on of transportation. Never before have we had nearly so much of a hearing on the relation of our costs and the price of a ride. Many persons have been wrung from skepticism to a fair appreciation of some of the important troubles of the electric railway men, and more of them can be won to that viewpoint.

We must use this wider interest in our business and better view of our problems as the opening to a stronger accord between the public.

#### OUTLOOK IS FAVORABLE

We have passed through the most tremendous times the electric railway industry has ever known. We are just now beginning to turn our attention once more to matters of operation which two years ago were in our daily thoughts but which have been lost to view by the weightier matter of finding a way to continue operation at all. In common with every other body of patriotic men we have had only one thought—the winning of the war and how we, of a vital industry in the line behind the line, might do our utmost to that end.

One of the results of this war will be the springing up of a crop of experts and here again the industry may reap benefit from their activities. New ideas and new methods are bound to be developed and we must be prepared to take advantage of those which are good. One way in which we can do so is to develop our own experts on our own properties, for the best expert I know of is an enthusiastic and ambitious man in one's own organization who follows the lead of the best opinion and experience as set forth in the technical journals and has the initiative and "pep" to apply them constructively to our own local problems.

In these and in other ways the future holds something for us. There is reason for optimism. We are at the dawn of a better day. True, the months that have passed have left some casualties along the way. That is the havoc of war, let us say, but we who have come through, somehow, must keep our faces to the front like good soldiers and win out for an industry that is just as vital in peace as in war.

## One-Man Car Service Started in Brooklyn

**Trial Operation Was Begun with Three Safety Cars, and Others Will Be Added to Completely Equip Test Lines**

THREE new one-man safety cars furnished by the American Car Company of St. Louis, Mo., were put in operation on one of the suburban lines of the Brooklyn Rapid Transit System last Sunday. Three more of this type, together with six to be furnished by George H. Tontrup of St. Louis, Mo., will be tested later. If the trial meets with the approval of the Public Service Commission and the service is acceptable to the public, it is planned to purchase a total of 150 one-man cars for use on lines in the outlying sections of Brooklyn.

The present trial is being conducted on a line running from the Sixty-fifth Street terminal of the Fifth Avenue Elevated Line to Fort Hamilton, a distance of 2 miles. Most of the passengers use this line as a means of connecting with the elevated road and the surface cars run into the elevated station up an incline so that no additional fare or transfers are required in making the transfer. The morning rush-hour service consists of picking up the load and taking it to the terminal, while during the evening rush hour the load received at the terminal is distributed. There is one transfer point to surface cars at the foot of the terminal incline. To provide for the present schedule on this line seven cars are used, three of which are one-man cars and the others are double-truck closed cars which is the type previously used in this service. The weight of the one-man cars is 14,500 lb. as against 31,000 lb. for the closed cars, and the one-man cars seat thirty-four passengers to thirty for the other type. The one-man cars thus have less than half the weight per seated passenger of the cars of the older type.

Previously the service was operated with a seven-and-one-half-minute interval during rush hours and a ten-minute interval during non-rush hours. With the introduction of one-man cars this has been reduced so now a three-and-one-half-minute interval is maintained during rush hours and a five-minute interval at other times. This increase in service should result in an additional increase in the number of passengers carried, as many who previously walked the short distance to and from the terminal rather than wait a few minutes for a car will now take to riding with the short headway. A complete trip in one direction requires twelve minutes and there is a three-minute layover at each end of the trip. This is sufficient for the operator to change ends, move the fare box, take register readings, and fill out his record cards for the trip. With the present service an average load during rush hours consists of from thirty-five to forty-five passengers, and during non-rush hours from eight to twelve is an average load. The wages for the operators of the one-man cars have been increased 5 cents per hour over the rate which they previously received as motormen. This increase in rates makes the work popular so that the most efficient motormen are anxious to operate these cars. The cars are equipped with the full complement of the now-familiar safety devices.



# Fifty-Fifty for Car Rider and Taxpayer

Massachusetts Commission Recommends Such Plan to Meet Deficit of Bay State System from Five-Cent Fare—Also Asks Aid from Taxation for Other Lines

IN LAST WEEK'S issue the ELECTRIC RAILWAY JOURNAL referred briefly to the fact that the Massachusetts Public Service Commission on Feb. 15 recommended the use of taxation to reduce the burdens of car riders in the State. This recommendation was made after an investigation requested by the Legislature on Jan. 24. From the full report now available the following details can now be added:

The first part of the investigation covered the Bay State Street Railway and was made jointly with the public trustees of this system. The company, it is said, was operated during the calendar year 1918 at a total deficit of \$2,918,500, the legislative act of that year being taken as a basis for comparative purposes. The total deficit for the year ended June 30, 1920, the first year of public-trustee operation, is estimated at \$1,817,900. The situation will make necessary further increases in fares, but the commission and the trustees believe that higher fares will be likely to increase congestion in the city centers and otherwise seriously impair the company's usefulness. Furthermore, they believe that any wholesale abandonment of routes would be a public misfortune.

Under the Bay State public control act, the trustees have no option but to collect the entire cost of service from the car rider. Wage increases, however, have increased operating costs far beyond those prevailing when this legislation was enacted. Because of the changed conditions, the commission and the trustees "are forced" to these conclusions:

It is no longer equitable to require the car rider to pay the very high fares which will be necessary and the car rider should be relieved, through taxation, of a moderate portion of the cost of service. In view of the unquestionable benefits which accrue to taxable property from adequate electric railway service at reasonable rates, we believe that such an arrangement will not impose undue burdens on the taxpayer.

We therefore recommend for enactment an amendment to the Bay State public control act. This amendment provides that the first 5 cents of the cost of service per passenger shall be paid by the car rider and that any costs beyond 5 cents per passenger shall be paid 50 per cent by the car rider and 50 per cent by general taxation. A commission would apportion the tax among the communities served and the initial payment by the taxpayer would be made in the autumn of 1920. In our opinion, the enactment of this amendment will prevent Bay State fares from going above the present level, and both fares and taxes will be gradually reduced as the trustees are able to decrease operating costs. We believe also that it will enable the trustees to continue in operation most of the lines which the receiver has petitioned the court for authority to discontinue.

In regard to the general electric railway situation in Massachusetts, which the commission reports upon by itself, various financial statistics are shown, some of which are given in Table I. The commission finds depreciation allowances insufficient and suggests that the annual sum of 1.8 per cent of the cost of permanent investments in addition to the maintenance expenditures be taken as a minimum requirement. It also says that

it is necessary to make provision at least for the payment of all dividends on preferred stock and a return upon the legitimate investment represented by common stock substantially equivalent to what the companies were able to pay under normal operating conditions up to a maximum of 5 per cent. With adjustments for these items and for certain tax eliminations, it is found that additional revenue of \$2,195,950 is required for the lines (excluding the Boston Elevated Railway, the Bay State Street Railway and the Massachusetts Northwestern Street Railways). Details of this deficiency are given in Table II.

In discussing how this deficiency would best be met, the commission says in part:

The present system, which throws the entire cost of service upon the car riders, apparently rests upon the assumption that the individual riders are the only persons who have any legitimate interest in the maintenance of good local transportation facilities. The fallacy in such an assumption is so obvious that it scarcely needs to be pointed out. In addition to the benefits received by individual electric railway patrons, there is a very large community benefit which can be measured by the losses in industry, trade, real estate values and other forms of community wealth which would result if all electric railway facilities were suddenly blotted out.

For this benefit, up to the present time, the community has paid nothing and has succeeded not only in unloading its legitimate part of the transportation burden upon the shoulders of the car rider, but also in making him pay, in addition, a portion of the cost of general municipal improvements through the imposition of special taxes and public charges. The only justification for the existing system is the fact that the burden is so widely distributed that fares in the past have been relatively low and their payment has involved no special hardship.

But when the car riders are compelled, as a large proportion of them now are through reductions in fare zones and increases in the unit of fare, to pay increases of fare varying from 100 per cent to 400 per cent, the inequality of the present system is thrown into strong relief. The burden is one that the car rider not only ought not to pay but, to speak broadly, cannot pay under present economic conditions.

TABLE I. STATISTICS OF MASSACHUSETTS ELECTRIC RAILWAYS FOR CALENDAR YEAR 1918\*

	All Railways	All But Boston and Bay State Systems
Capital stock .....	\$84,823,200	\$33,412,300
Capital stock and premiums .....	89,266,374	34,789,565
Passenger revenue .....	42,817,200	12,905,847
Other operating revenue .....	2,546,849	1,010,473
Total operating revenue .....	45,364,050	13,916,320
Conducting transportation .....	16,292,878	4,525,011
Depreciation .....	2,538,031	249,361
Other operating expenses .....	21,994,833	7,267,018
Total operating expenses .....	40,825,743	12,041,391
Net railway revenue from operation .....	4,538,307	1,874,928
Taxes .....	2,007,182	691,292
Operating income .....	2,531,124	1,183,635
Non-operating income .....	221,560	73,567
Gross income .....	2,752,684	1,257,203
Deductions for gross income .....	8,229,833	1,646,227
Deficit .....	5,477,148	389,023
Estimated deficit for 1919 .....	4,725,580	267,779

\*In the case of certain individual companies the figures are based on actual returns for eleven months and estimated returns for one month.



The first step to be taken, the commission says, is to relieve the companies of the incubus of the special taxes and public charges, and it submits the draft of a bill intended to accomplish that result. In its opinion, however, relief of this character will go only a short way towards meeting absolutely essential revenue requirements. The commission is convinced that direct community contributions through the tax levy is the only practicable way out of the present transportation difficulties. The plan which the commission submitted jointly with the trustees for the Bay State system is said to be perhaps as fair a method as can be devised, but owing to the diversity in fare zones and methods of collection on the lines of the various companies, its general application to all the electric railways of the Commonwealth would be impracticable.

In evolving a suitable general plan, the commission says in part:

We believe that the most urgent need of the present electric railway situation is to take measures that will not only save the public from the further increases of fare which are now imminent, but will permit the gradual reduction of present fares to a more moderate level. Instead of the present rigid system under which the entire cost of the service must be borne by the car rider, irrespective of where the application of that principle may lead, those charged with the responsibility of establishing or regulating fares should be allowed sufficient discretion to enable them to fix fares which are consistent with the general public interest.

It is easier to understand the principle which should govern than to state it by any concise and specific formula. It may, however, be expressed by requiring fares to be fixed which will meet the cost of the service in so far as this may be done without unduly hampering or discouraging the free movement of traffic and the economic development of the communities served or otherwise injuriously affecting the general public interest.

If fares established upon that basis do not yield sufficient revenue to meet the legitimate requirements of the company, the balance should be met by an addition to the tax levy up to a reasonable maximum, which we suggest should be \$2 on each \$1000 of assessed valuation. Any such appropriations should be coupled with public control.

We submit the draft of a bill embodying this general plan. It was necessary, in making provision for the assessment of taxes, to meet the situation resulting from the fact that about seventy cities and towns are served by two or more electric railways. As one of such companies might accept the act and the others not, we have suggested that the tax in such cities and towns be apportioned upon the basis of track mileage. With this adjustment we believe that the tax should be apportioned to the various cities and towns served on the basis of valuation. This method is based upon the ability of the several communities to pay, which is the principle underlying all taxation. An apportionment on the basis of the number of car riders, which is the method adopted in the special Bay State and Boston Elevated acts, seems to us illogical and unsound, as it is not those who ride but those who fail to ride who are responsible for the present deficits.

The practical effects of this general plan for all companies except the Boston Elevated, Bay State and Massachusetts Northeastern companies are shown in Table II. Provision for the assessment of the revenue deficiency

is already made in the Boston Elevated act, and a separate plan for the assessment of such deficiency in the case of the Bay State system has been presented. The other exception is the Massachusetts Northeastern Street Railway, which is an interstate road incorporated in both Massachusetts and New Hampshire with its lines interlacing across the boundary between the two states. If it should be thought desirable, some feasible method might possibly be found for accomplishing the same general results in the case of that company, but this could probably be done only through a special act.

#### HOW THE TAX RATE WOULD VARY

It is said that four companies (East Taunton, Lincoln, Lowell & Fitchburg and Union) fully meet the revenue requirements defined in the act without any tax contribution. These companies would not be affected by the act, as they would have no inducement to accept it. In the case of all the other companies there would be a deficit to be met from the tax levy amounting in the average to \$1.24 per \$1,000 of valuation. Seven companies (Berkshire, Blue Hill, Boston & Worcester, Concord, Maynard & Hudson, Milford, Attleborough & Woonsocket, Nahant and Lynn) would require the maximum tax of \$2, and even that amount would be insufficient to meet their estimated revenue requirements. In the case of three important roads (Springfield, Holyoke and Middlesex & Boston) the rate would be approximately \$1. The rate for the Worcester Consolidated would be \$1.78, and the rate for the other roads would vary from \$1.96 for the Northern Massachusetts down to \$0.17 for the Interstate Consolidated.

The plan suggested is intended to be merely a measure for tiding over the present emergency. The legislation suggested is therefore to be effective only until Dec. 31, 1922. In the commission's opinion, any temporary plan and, indeed, any permanent plan which falls short of public ownership will not fully restore electric railway credit. It is believed that the plan suggested, however, should at least improve credit and by making better provision for depreciation should assist in the rehabilitation of the properties and thus make possible better service as well as lower fares than would otherwise prevail.

#### Meeting of Oklahoma Association

THE Oklahoma Utilities Association held its annual convention at Oklahoma City, Okla., on Thursday, Friday and Saturday, Feb. 6 to 8. One of the papers presented at the meeting was on the present status of the electric railway industry. The author, J. W. Shartel, vice-president and general manager Oklahoma Railway, reviewed the prosperity which the interurban lines had brought to the communities in Oklahoma but said that the conditions surrounding electric railway construction now made further development impossible. The electric railways need greater revenue, but the public seems indifferent to their condition. Automobiles will not solve the question of city transportation, partly because they are inherently more expensive, partly because of the room which they occupy on the street and partly because they cause many accidents. The speaker recommended rigorous traffic regulations for automobiles, increased schedule speed for electric cars and higher fares.

TABLE II. ESTIMATE OF CONTRIBUTION TO BE NEEDED FROM TAXES IN MASSACHUSETTS

1918 deficit for all lines except Boston, Bay State and Massachusetts Northeastern companies.....	\$364,293
Additional allowance for depreciation .....	892,914
Return on stock .....	1,254,898
Total deficit .....	\$2,512,105
Excise and franchise tax .....	316,154
Additional revenue required .....	\$2,195,950
Assessed valuation of districts served by the twenty-one railways included .....	\$1,817,855.145
Average additional tax per \$1000 .....	\$1.24



# C. E. R. A. Meets in Cleveland

President Coen Says Future Looks Brighter for Electric Railways Than a Year Ago—  
J. F. Collins, Michigan United Railways, Was Elected President for Ensuing  
Year—Association Decides to Resume Annual Boat Trip

THE annual meeting of the Central Electric Railway Association was held in the new Hotel Cleveland, Cleveland, Ohio, on Feb. 27 and 28. Papers were presented by J. T. Sullivan, general manager Mahoning & Shenango Railway & Light Company, on "Ethical Aspects of the Street Railway Situation," by G. H. Kelsay, electrical engineer Union Traction Company of Indiana, on "Power House Economies," and by A. B. Cole, publication department Westinghouse Companies, on "Freight Haulage." An abstract of Mr. Sullivan's paper is published elsewhere in this issue, and a report of the proceedings on Feb. 26 is given below. An account of the proceedings on Feb. 27 with abstracts of the papers by Messrs. Cole and Kelsay will be published next week.

There was a good attendance at the meeting, some 300 members being present. F. W. Coen, vice-president and general manager Lake Shore Electric Railway and president of the association, presided. At the opening of the morning session A. R. Corlett, representing Mayor Davis of Cleveland, presented the association with a large key, symbolizing the freedom of the city.

## PRESIDENT COEN SAYS FUTURE LOOKS BRIGHTER

In his presidential address Mr. Coen reviewed the unusual conditions under which electric railways had operated during the past year. Increased income, he said, has been necessary, and those in authority have in general met the situation by granting additional rates where they had the ability. The utilities are not yet on the basis that they should be, but as a whole the future looks much brighter for them than it did a year ago. There are too many different political bodies telling the electric railways what to do. Some centralized authority would more likely be free from prejudices growing out of local conditions.

In each state, according to Mr. Coen, there should be one body with authority over railway properties on the one hand to determine construction, operation and service requirements and on the other to prescribe such rates as may be necessary to cover operating and maintenance costs and a return on the investment. The speaker had no quarrel with the jitney and auto-truck if they supply transportation needed by the public, but they should be compelled to fulfill the requirements of common carriers. The war has taught many lessons of co-operation which should be applied on electric railway properties. The public also should be told of the unjust burdens which are now being imposed on the railways.

In conclusion, Mr. Coen expressed a feeling of optimism—a belief that the cloud which has overhung the industry for many years shows a silver lining and that better things can be expected if the railway's case is presented fairly and continuously.

The annual report of A. L. Neereamer as secretary and treasurer of the Central Electric Railway Association

for the year ended Dec. 31, 1918, was then presented. An abstract follows:

During the past year the association has held three meetings as follows: Dayton, Ohio, Feb. 28 and March 1; Cedar Point, Ohio, July 17 and 18; Indianapolis, Ind., Nov. 21 and 22. The interurban railway membership of this association as shown in the report for the year 1917 consisted of sixty-eight interurban lines, operating 4927 miles, and two city lines. During the year we have lost five interurban lines and 113 miles; the membership for the year ending Dec. 31, 1918, being sixty-three lines operating 4814 miles. This is the net result shown above for the reason that we secured one new line, and one of the larger lines separated into two companies which would make the total loss in interurban lines seven.

During the year 1917 we had 140 supply members and in the year just ended 126, a decrease of fourteen.

The receipts and disbursements for the year 1918 are as follows:

Receipts:			
Cash on hand	.....	\$1,608 95	
Receipts	.....	7,219 24	
Disbursements	.....		\$7,866 97
Cash on hand	.....		968 12
		\$8,828 19	\$8,828 19

You will note from this statement that while the cost of all material has greatly increased, the operating expenses have been kept down to the minimum.

During the first portion of the year there was considerable work done for the committee on military efficiency and defense, and the data sheets and records were completed so far as reports could be secured from the member companies. The work of this committee of course ceased with the signing of the armistice on Nov. 11, 1918.

Investments were made during the past year as follows:

Third Liberty Loan	.....	\$500.00
Fourth Liberty Loan	.....	500.00
Paid on running stock of the Railroadmen's Building and Savings Association	.....	75.00
Total	.....	\$1,075.00

For the information of the members I am submitting herewith a statement of the expenses of the Central Electric Railway Accountants' Association:

Total expenses for the year	.....	\$20 31
Received from sale of pamphlets	.....	00.00
Balance	.....	\$20.31
Dues at \$5 per annum from two lines not members of the Central Electric Railway Association	.....	10.00
		\$10.31

The secretary and treasurer also submits herewith a statement of current assets and liabilities of the association for the year just ended:

Current Assets:			
Cash on deposit	.....	\$962.12	
Investments—Liberty Bonds	\$1,500.00		
Railroadmen's Building and Savings Association	3,031.56	4,531.56	
Due from members	.....	266.68	
Liabilities	.....		\$0,000.00
Balance	.....		5,760.36
		\$5,760.36	\$5,760.36

An explanation of the items covering stationery and printing and the miscellaneous charge against the Central Electric Traffic Association, a statement is submitted herewith of the expenses and receipts of that association for the year 1918:

Received from sale of tariffs	.....	\$865.54	
Traveling expenses	.....		\$158.06
Stationery and printing	.....		746.30
Postage	.....		40.00
Telegraph and telephone	.....		16.89
Freight and express	.....		9.90
Legal expense	.....		35.00
Due from member companies	.....	62 02	
Deficit	.....	43.59	
		\$1,006.15	\$1,006.15



The financial affairs of the association are now in the best condition they have been since its organization and this situation is only achieved by careful watching of each and every expense, buying at the proper time on the market and only at such times as is absolutely necessary to have supplies in the office. We were very fortunate in the purchase of some of the stationery, of which we use a great deal, in a large quantity before a very marked advance in price.

In closing this report the secretary and treasurer desires to thank the officers, committees and members for the assistance given him in the discharge of his duties during the past year.

At the conclusion of the report an amendment to the by-laws raising the dues of the supply members of the association to \$10 a year was adopted. Thirty-four applications from supply men were received and acted on, making membership largest in history. An amendment making past presidents ex-officio members of the executive committee was also approved. S. D. Hutchins then outlined proposed boat trip, on July 8 to 11, from Toledo to Benton Harbor, and Chicago was then approved by the meeting. A telegram was then read from J. H. Pardee containing the greetings of the American Association and urging united action in the present railway crisis and attendance at mid-year meeting in New York on March 14.

Mr. Sullivan then read his paper on the "Ethics of the Street Railway Situation," which appears on page 413 of this issue. There was no discussion.

#### OFFICERS ELECTED

On Friday morning the following were elected officers for the ensuing year: President, J. F. Collins; vice-presidents: R. I. Todd, Indianapolis and A. C. Blynn, Akron.

Executive committee; F. D. Carpenter, Lima, H. A. Nicholl, Anderson; F. W. Coen, Sandusky; C. L. Henry, Indianapolis; F. R. Coates, Toledo; C. N. Wilcoxon, Michigan City; S. W. Greenland, Fort Wayne; W. S. Rodger, Detroit; F. J. Haas, Evansville; A. C. Van Driesen, Toledo; J. R. Farrell, of the General Electric Company, Indianapolis; L. G. Parker, of the Cleveland Frog & Crossing Company, Indianapolis.

A. L. Neereamer was later re-elected secretary and treasurer by the new executive committee.

### Inexpensive Guard Prevents Dropping of Shavings and Drilling from Overhead Work



**T**O PREVENT drillings from dropping into the eyes of the workmen when drilling overhead and to keep the machinery below free from dirt and grit, the guard shown in the accompanying illustration has been found very effective. This guard can be constructed of cardboard or even newspaper. It is simple and inexpensive and its use may save a great amount of trouble.

A funnel of suitable size is placed over the drill and the bottom is wound with string to make a close fit around the bit-stock. The grit and chips from the work are collected in the funnel and after the work is done it can be easily removed and cleaned out.

### Welding Third-Rail in Cuba

**T**HE welding of third-rail has received very little attention in the United States except on recent rapid transit lines. The practice has been used quite extensively abroad, however, and an accompanying illustration shows such a weld being made in Cuba. This weld of the conductor rail was made by the Spanish-



WELDING THIRD-RAIL AT FELTON, CUBA

American Iron Company at Felton, Cuba, with thermit. Some of the welds were made under very difficult circumstances as the wind was blowing at a rate of about 20 m.p.h. and frequent showers occurred. In some cases it was almost impossible to keep the preheating torch in operation. In this case the entire rail section was welded.

### London Underground's Pictorial Souvenirs for Its War Workers

As a token of appreciation of those employees, new and old, who were "carrying on" while their predecessors were at the front, the Underground Railways and the associated London General Omnibus Company have issued a series of lithographs entitled "Playing the Game." Each lithograph is of an employee sketched from life in the performance of his or her duties with an auxiliary photo-derived drawing below where appropriate of the corresponding service on the battle grounds. For examples, the drawing of the lorry-makers (for war work) is accompanied by a picture of a line of auto trucks wending their way along a French highway; the shell turners are paired with a scene depicting the use of their output; the women painters are accompanied by camouflage artists, etc. Bus conductresses, lift girls and others are reminded in like manner of the war service of the men they were employed to replace. The bus driver shown in one plate actually transported soldiers through France, while the plate layer or trackman is a veteran of Mons.

These sketches are auto-lithographs, being drawn by the artist directly on the stone. Each employee has received a copy of the sketch depicting his or her line of work, and complete sets of twelve have been made up for the officials of the companies mentioned, under the direction of the advertising department.

It is reported that there is in process of formation in Great Britain an association for the reduction of industrial accidents. Presumably this will be formed along the lines of the National Safety Council whose work has been so successful in this country.



## First 1917 Census Figures Out

### Reports for Electric Railway Lines of Six States Show the Heavier Burden of Expenses in Later Years

IN THE CASE of six states preliminary figures of the forthcoming quinquennial report on electric railways have been given out by Director S. L. Rogers of the Bureau of the Census, Department of Commerce. The statistics all indicate the tendency of operating expenses to increase more rapidly than operating revenues.

The statistics relate to the years ending Dec. 31, 1917, 1912 and 1907, but only those for the decade are reproduced in the accompanying table. The totals include electric light plants operated in connection with electric railways and not separable therefrom, but they do not include mixed steam and electric railways or electric railways under construction.

During the decade 1907-1917 and the five-year period 1912-1917 Vermont showed substantial gains in the number of passengers carried and in revenues from railway operations. The marked increase in operating expenses for 1917, however, resulted in a decrease of 69.1 per cent in net income as compared to 1912, although there still remained a gain of 57.4 per cent over 1912.

The statistics for Arizona and New Mexico, it is said, show general increases at each successive census. Those for Idaho and Wyoming show small gains in trackage, equipment and income for the semi-decade 1912-1917,

but they are far below the gains made during 1907-1912.

The figures for Mississippi show substantial gains during the decade 1907-1917, but the growth was chiefly confined to the first half of the period, the railway revenues in 1917 being slightly less than in 1912 and the operating expenses materially greater. In the case of Colorado, there were marked losses for 1917 as compared to 1912 which more than offset the gains made in 1912 as compared to 1907. Oregon suffered decreases in traffic and income for 1917 as compared with 1912, with marked increases in operating expenses and overhead charges, in contrast with large gains for the preceding semi-decade 1907-1912.

## Connecticut Engineers Meet

THE thirty-fifth annual meeting of the Connecticut Society of Civil Engineers, held in New Haven on Feb. 18 and 19, was the largest gathering in the history of the association. William R. Dunham, Jr., engineer maintenance of way Connecticut Company, has been president during the past year.

During the two-day session two topics of electric railway interest were presented to the association. One was a paper read on the afternoon of Feb. 18 on "Street Railway Track Reclamation" by H. J. Tibbet. The other was an address at the annual banquet by J. K. Punderford, vice-president and general manager Connecticut Company, in which the speaker described the difficulties under which electric railways are contending. Charles J. Bennett of Hartford was elected president for the ensuing year.

PRELIMINARY 1917 STATISTICS OF CENSUS BUREAU FOR ELECTRIC RAILWAYS IN SIX STATES

	Vermont		Arizona and New Mexico		Idaho and Wyoming		Mississippi		Colorado		Oregon	
	1917	Per Cent Increase Over 1907	1917	Per Cent Increase Over 1907	1917	Per Cent Increase Over 1907	1917	Per Cent Increase Over 1907	1917	Per Cent Increase Over 1907	1917	Per Cent Increase Over 1907
Number of companies (all operating).....	9		6		6		11		15		8	
Miles of line.....	92.60	*20.7	57.49	c 52.0	120.01	j 179.1	112.36	40.8	337.15	63.4	416.28	145.9
Miles of single track.....	107.95	*13.2	63.84	d 56.3	127.70	k 188.7	122.79	42.1	499.87	57.5	596.23	135.3
Miles of single track in state (a).....	125.47	10.7					124.17	43.7			603.13	132.9
Cars.....	156	*1.9	66	65.0	88		187	34.5	817	29.5	1,431	113.6
Passenger.....	112	*11.1	62	59.0	68		169	36.3	564	19.0	744	59.7
All other.....	44	33.3	4	300.0	20		18	20.0	253	61.1	687	236.8
Electric locomotives.....							7				22	
Number of persons employed.....	311	16.9	224	138.3	204		627	29.8	2,402	38.2	3,057	151.4
Salaries and wages.....	\$259,205	65.6	\$221,711		\$189,209		\$392,600	47.6	\$2,126,531	47.7	\$2,976,798	178.6
Total horsepower.....	8,394	54.0	989	*16.2			16,035	48.3	58,139	166.8	113,950	
Steam engines:												
Number.....	1		1	*75.0			20		26		12	
Horsepower.....	200	*92.6	525	*55.5			16,035	48.3	55,739	180.0	33,950	
Water wheels:												
Number.....	14								8		24	
Horsepower.....	8,194	198.0							2,400	27.6	80,000	
Internal combustion engines:												
Number.....			1									
Horsepower.....			464									
Kilowatt capacity of dynamos.....	7,727	58.5	665	*45.9			12,575	82.2	39,770	191.7	64,880	
Output of stations, kilowatt-hours.....	11,601,930	180.7	1,526,960	35.8			20,022,367	37.0	98,227,472	133.3	218,086,315	
Current purchased, kilowatt-hours.....	10,152,558		4,010,388		6,587,229		3,279,254		13,281,070		15,066,427	
Passengers carried.....	9,268,385	24.2	9,488,467	202.6	5,036,166	234.1	12,215,749	18.4	102,882,744	9.8	91,926,694	43.8
Revenue.....	8,738,378	23.0	8,969,329	206.0	4,736,414	256.9	10,730,801	18.1	84,623,896	15.2	67,222,935	36.7
Transfer.....	483,389	35.2	403,128	159.6	207,759	32.1	1,191,255	11.5	16,785,922	*8.6	22,229,134	83.0
Free.....	46,618		116,010	145.5	91,993	297.8	293,633	82.9	1,472,926	*20.9	2,474,625	6.4
Revenue car mileage.....	1,865,039	3.0	1,729,926	48.2	1,796,833	365.5	3,990,356	42.5	17,021,284	16.6	22,528,731	49.9
Railway operations—revenues.....	\$596,983	35.3	\$446,218		\$521,988		\$617,527	23.5	\$4,728,732	39.9	\$4,999,601	83.0
Auxiliary operations—revenues.....	229,586		146,795				583,515	83.6	1,051,044		2,102,832	
Non-operating income.....	48,489	277.0	20,320		2,194		24,670	*72.1	46,736	*86.7	184,711	*79.4
Income from all sources.....	\$875,058	92.6	\$613,333	171.8	\$524,182	†	\$1,225,712	35.2	\$5,826,512	30.0	\$7,287,144	100.9
Operating expenses.....	\$599,446	91.0	\$456,542	184.7	\$375,858	†	\$890,006	66.5	\$3,404,817	62.8	\$4,240,891	158.9
Deductions from income.....	239,724	103.8	123,947		132,786	†	455,148	83.6	2,211,329	73.7	3,674,831	270.2
Net income.....	\$35,888	57.4	\$32,844		\$15,538	†	*\$119,442		\$210,366	*81.1	*\$628,578	

\* Decrease or deficit. † Figures not available.

(a) Excluding track lying outside of state but operated by companies within state, and excluding track in state operated by outside companies.

(b) Arizona, four companies; New Mexico, two companies.

(c) Arizona, 46.87 miles of line; New Mexico, 10.60 miles of line.

(d) Arizona, 52.89 miles of single track; New Mexico, 10.95 miles of single track.

(e) Arizona, increase in miles of line, 64.9 per cent; New Mexico, 12.8 per cent.

(f) Arizona, increase in miles of single track, 72.0 per cent; New Mexico, 84. per cent.

(g) Idaho, four companies; Wyoming, two companies.

(h) Idaho, 98.24 miles of line; Wyoming, 21.77 miles of line.

(i) Idaho, 104.65 miles of single track; Wyoming, 23.05 miles of single track.

(j) Idaho, increase in miles of line, 128.5 per cent; Wyoming had no mileage in 1907.

(k) Idaho, increase in miles of single track, 136.6 per cent; Wyoming had no mileage in 1907.

(l) Including 4 miles of line and single track not operated.



## Getting Good Results in Lubrication of Air Compressors

### Careful Selection of Lubricating Oil, Proper Quantity to Use and Cleaning Cylinders and Piping Are Important Factors

BY H. V. CONRAD

Mechanical Engineer and Secretary of the Compressed Air Society, New York City

**T**O SECURE satisfactory lubrication of air compressor cylinders friction of moving parts should be reduced to a minimum and the carbonization of the oil should be eliminated as far as possible. For the proper reduction of friction the oil chosen should have sufficient body to sustain the weight of the moving parts and to form a seal between the piston rings and the cylinder walls and still not absorb excessive power in the overcoming of the viscosity of the oil itself. Carbonization of the oil allows the accumulation of deposits of carbon which are sticky in the early stages of their formation but hard and flinty later. Such deposits accumulate on the cylinder valves, in the cylinder passages, in the pipes and eventually in the air receiver.

The formation of excessive carbon deposits may be due to (1) ill-advised use of oils of too great viscosity which do not atomize readily and therefore remain too long upon the hot cylinder walls, thus breaking down to sticky carbon deposit; (2) use of too great quantities of oil which have the same effect as the use of too heavy an oil as far as the carbonization is concerned; and (3) failure to provide a proper screen over the air intake of the compressor.

#### QUANTITY OF CYLINDER LUBRICANT NECESSARY

For average normal conditions the oil should be a medium-bodied pure mineral oil of the highest quality, not compounded with fixed oils such as animal or vegetable. It should be carefully filtered in the final process of manufacture. Quite a range of oil composition is permissible for lubricants suitable for this work which are manufactured under the above conditions. Primarily a distinction must be made between those oils having a paraffin base as distinguished from those having an asphaltic base.

From an operating standpoint strictly some lubricant manufacturers claim there is no distinction between the two classes of lubricants as to their desirability provided the process of manufacture is carefully carried out. If any carbon should be formed, however, such carbon deposited by the asphaltic base oils is of a light fluffy nature and is easily cleaned out, whereas that deposited by the paraffin base oil is very adhesive and characterized by the hard flinty nature.

#### QUANTITY OF LUBRICATING OILS NECESSARY

The quantity of lubricating oil necessary for the air cylinders of compressors cannot be stated in exact terms due to the varying viscosity of different oils, the heat of compression and the size of the cylinder. It may be stated in general, however, that after the cylinders have acquired smooth and polished surfaces the quantity should be reduced to the lowest limits to avoid the possibility of the accumulation of carbon and sooty deposits within the system due to use of excessive quantities of oil.

A leading authority on compressor engineering states: "The best way to determine the proper amount of lubrication is to take out the valves from time to time and examine the cylinder. If the parts feel dry the lubricators should be adjusted to feed a little more oil, whereas if oil lies in the cylinder and its parts show excessive oil thereon, the quantity set by the lubricators should be reduced. By thus examining the machine a few times the proper amount of oil can be determined to suit the characteristics of the particular lubricant used and the conditions under which the machine operates."

#### PERIODICAL CLEANING IS NECESSARY

The best of lubricating oils will cause the deposit of enough carbon in the compressor system to necessitate the periodical cleansing of it. For the removal of carbon a good cleansing solution is made of one part soft soap to fifteen parts of water. The suds should take the place of oil for a few hours and be fed into the air cylinders about once a week either by means of a hand pump or through the regular lubricator at a rate of about ten times as rapidly as that of the oil. Air valves should be inspected periodically and these will indicate whether more or less frequent applications of the soap suds should be made. After soap suds have been used the drain cocks of the air receiver, and of the inter-cooler in case of compound machines, should be opened to draw off any accumulated liquid. Oil should be used again for a half hour before shutting down the machine in order to prevent rusting of the cylinder and fittings. Kerosene, gasoline or lighter oils should never be used in an air cylinder for any purpose whatever because of their volatile nature under heated conditions.

### Glasgow's Extraordinary Gear Life

**D**URING seventeen years of electric operation, the number of gear wheels scrapped by the Glasgow Corporation Tramways, due to all causes and regardless of the makes furnished, has approximated the extraordinarily low figure of 1 per cent per annum. The chief defects which necessitate scrapping are given by the management as follows:

1. The splitting of hubs at the keyway. This defect is largely due to the fact that the wheels were designed originally for 3½-in. axles. Subsequently the bore of the hub was increased to 4½ in. to fit the increased size of the axles which the Tramways had found it necessary to use. This change, of course, weakened the hubs.

2. Broken teeth.

3. Cracked arms or spokes.

4. Distorted rims.

5. Worn-out teeth, which are responsible for the scrapping of approximately 0.1 per cent of gears per annum.

Careful maintenance and lubrication are assigned as the reasons for the great longevity of Glasgow's gears. By careful maintenance are understood frequent and systematic inspection and overhaul; the selection of the best bearing metal procurable; strict attention to the fit of armature shaft and axle bearings; maintenance of the mesh of the wheel and pinion to the full depth of the teeth and lubrication with oil.



## Recent Happenings in Great Britain

### England Proceeding to Orderly Reconstruction—Traffic Increases Rapidly—Many Inquiries for Cars

(From Our Regular Correspondent.)

With the beginning of the year the new British government began to manifest activities in various directions in connection with the work of reconstruction after the war. Among other things, we are promised a Ministry of Ways and Communications, with Sir Eric Geddes, lately First Lord of the Admiralty and formerly a noted steam railway manager, at the head of it. Hitherto there has been no such ministry in this country, and such of its functions as were performed were carried out as part of the duties of the ried out as part of the duties of the partment has been responsible for supervision of railways and tramways so far as they have been supervised, while automobile road vehicles have been under the care of the local government board and of the home office. Presumably it is intended that all sorts of vehicular traffic, whether on rails or on the highways, shall come under the purview of the Ministry of Ways and Communications. The change should put a stop to overlapping and effect greater efficiency in administration.

#### INEXPENSIVE LIGHT RAILWAYS PROPOSED

During January the Ministry of Reconstruction made public a scheme for providing the agricultural districts with a system of cheap light railways intended mainly for the benefit of farmers and rural industry. To distinguish these lines, which are to be of only 2-ft. gage, from all others, it is proposed that they should be called "agrails," which may be regarded as short (very short) for agricultural light railways. It is proposed that an "agrail" board should be set up, which in conjunction with the local authorities should devise schemes and get them authorized by the ordinary procedure before the light railway commissioners. The cost of construction, which would be kept down as much as possible, would be borne partly by the Development Commissioners and partly by the local authorities. The lines when built would be leased to operating companies. Generally, in fact, the Belgian system of light railways, so widely and favorably known before the war, would be followed. Either steam or electric traction will be employed according to local service. Passengers will be carried, but the main purpose is to convey goods. The lines are to be laid as far as possible on roadside wastes, but where necessary they will be constructed on the roads themselves or on private land. The cost of compulsory land acquisition is to be cheapened.

#### A TIP FROM THE U. S. A.

The scheme looks promising. It reminds one also of the efforts which are being made in the United States to cul-

tivate good traffic on existing inter-urban electric railways. In this country we have next to no interurban electric railways and the suggested "agrails" would serve a useful purpose. Among the reasons why cheap light railways are preferable to motor lorries or trucks is that the latter wear out the country roads and that the owners of them are likely in the future to be called on to pay much more for road maintenance than they have in the past. Already, however, the automobile interests are protesting against the scheme and maintaining that road motor lorries would be preferable. I am strongly reminded of a very forcible leading article on corresponding contentions which appeared in your pages a year or two ago under the title "The Mantle of Ananias."

#### LEGISLATIVE PROGRAM PROPOSED

Possibly before these lines meet the reader's eye the British government will have submitted proposals to Parliament for dealing with the whole of the railways and with the production of electric power for all purposes. The Prime Minister told a deputation of railway employees in January that legislation of this sort would be passed as soon as possible, and therefore he asked them to suspend their further demands for improved conditions of labor. Whether the government proposals will amount to out-and-out nationalization or whether there is to be a more modest scheme of state ownership and unification with leasing to operating companies remains to be seen.

#### VALUE OF UNIFICATION REALIZED

Among reports by government committees there have been none recommending complete railway nationalization, but the great advantages of a unification of the railway systems of the country have been pointed out. One story goes that the new Ministry of Ways and Communications will simply be given powers to deal with the matter. That may mean further inquiry and delay. As regards the generation and distribution of electric energy for all purposes, there have been two important reports, recommending a national scheme requiring only a few power stations, but these to be of an enormous capacity, and the formation of one general and a number of district boards for carrying out and administering a scheme calculated to produce an enormous saving in coal, the electrification of steam railways, and the development of industries of all sorts by a cheap and abundant supply of electric power. What relative authority the state, the local authorities and private enterprise will have in the matter remains to be seen when the government proposals are tabled. Such

proposals will be the carrying out of general promises given by the Prime Minister during the recent general campaign.

In any event the day of small extravagant electric power stations, many of them owned by municipalities, will be ended. Municipal authorities, of course, regard the scheme with a jealous eye, but the railways and the industries generally will probably welcome it. The possible economies are enormous.

#### ELECTRICAL INDUSTRIES REVIVING

The revival which is already taking place in British electrical industries is indicated by the fact that according to a semi-official statement electrical manufacturing firms in Great Britain had under construction at the end of 1918 plants representing 700,000 kw., which is equal to more than 30 per cent of the capacity of the plants now in existence in the country. So far as tramways are concerned, January saw a beginning of the coming demand for new rolling stock. Quite a number of tramway undertakings are in the market for cars and also for motor omnibuses. These could not be secured during the war, but manufacturing for civilian purposes is now being rapidly resumed. As soon as supplies are abundant the demand for rails will be very heavy, as a great proportion of track is quite worn out. Prices, however, do not promise speedily to come down. Talking about prices, I notice that the government is offering to sell stocks of aluminum (which it accumulated while the war was in progress) at £150 a ton.

#### LABOR SITUATION SERIOUS

In the end of January the labor situation alike in England, Scotland and Ireland was very menacing. There were extensive strikes in the shipbuilding and engineering trades and efforts were being made by the agitators to draw tramway employees into the whirlpool. The latter, however, if they do not break away from their trade union leaders—rather a prevalent practice nowadays—were not in a position to strike immediately, because the unions and the company and municipal tramway authorities were negotiating over a demand by the employees for a forty-four-hour week. The nominal cause of all or most of the strikes was a demand for shorter hours, but there was a revolutionary sentiment abroad. Some of the strike leaders were political extremists of a dangerous type. The tension of the war and of war work having relaxed, it is difficult to say how far some of the working classes may be led.

Meanwhile traffic on the electric tramways in all parts of the country continues almost overwhelming in its volume, and it can only be by degrees that sufficient men and rolling stock can be secured to deal with the sudden and extraordinary demand which has arisen.



# News of the Electric Railways

FINANCIAL AND CORPORATE • TRAFFIC AND TRANSPORTATION

## PERSONAL MENTION

### Favors City Ownership

**Cleveland Mayor Not Satisfied with Results Under the Much-Heralded Service-at-Cost Plan**

Mayor Harry L. Davis advised the City Council of Cleveland, Ohio, in a communication read at the regular meeting on Feb. 24, of his conviction that the city should purchase the property of the Cleveland Railway. A resolution, providing that the question should be submitted to a vote of the electors on Nov. 4 was introduced and referred to the street railway committee.

#### RENEWAL OF FRANCHISE NECESSARY

The company's franchise must be renewed by May 4 next for a period of not less than fifteen years, the time the present franchise has yet to run, or the company may take over the control of operation from the city and fix a rate of fare that will insure dividends and a renewal fund for the time it will continue to operate the road. Mayor Davis proposed a renewal for a period of one year, so that the question of municipal ownership may be submitted to a vote and, if carried, the property may be purchased at an early date. J. J. Stanley, president, has stated that the company will not accept a renewal for a short period, as nothing of the kind is provided for in the Tayler franchise.

In his communication the Mayor says that the present franchise has shown a number of advantages, but there have also been many disadvantages. Among the latter he notes as the most serious the tendency of a fixed return to produce a lukewarm attitude on the part of the owners, lack of incentive toward efficiency and a desire only to look after the upkeep and thus insure their own security.

#### PAYMENT OUT OF EARNINGS SUGGESTED

The company, he says, has refused proposals for extensions in outside territory, one of the things that is required by the growth of the city. Divided responsibility as to expenses and the city's lack of power as to wages and working conditions have produced awkward results that have become apparent in the last year. Under municipal ownership, the people will be able to regulate the rate of fare, decide upon extensions, and, in fact, have the road operated as they want it. It is suggested that the payment for the property be made out of the earnings, instead of by the issue of bonds.

The Tayler ordinance provides that the city may take over the property

by paying the company \$110 a share for the stock. On the outstanding stock, aggregating \$27,780,000, this would amount to about \$30,560,000. In addition a bond issue of \$5,495,000 would have to be assumed, making in all, with the addition of a deficit of \$500,000 in the interest fund, \$36,555,000.

As yet there has not been much comment on this suggestion.

For several weeks murmurings in regard to amendments to the Tayler franchise have been heard. For the most part these have referred to additional power of control for the city. Company officials have not made any public comment on this as yet.

The company has been planning to spend between \$3,000,000 and \$4,000,000 for improvements and extensions, in order to furnish a more efficient service. Mr. Stanley said, however, that the company cannot go ahead with its plans unless the franchise is renewed in accordance with the terms of the Tayler grant.

### Colonel Byllesby Defends Private Ownership

In a telegram to the Oklahoma Utilities Association in convention at Oklahoma City, Col. H. M. Byllesby, president of H. M. Byllesby & Company, Chicago, said:

The trend of events in the utility situation is one which should command our most earnest, thoughtful and active attention. It seems to me that only two courses are open to the utility business; first, that the laws be so adjusted as to enable these companies to make such a fair return upon their investment as will enable them to find capital continuously for the further extension of their enterprises which the growth of the community served and the improvements in the art render increasingly necessary. These laws and regulations at the hands of commissions or other properly authorized bodies should encourage in every proper way the spirit of enterprise and provide some profitable return beyond the mere bare interest on the cost of the properties in order to bring to bear the very best inventive and enterprising capacities of all those engaged in this business.

If the laws and regulations cannot provide for this situation then it seems to me that the only alternative for the various communities is that they take over the properties at a fair and suitable compensation to the owners, as I am confident that at bottom no real American wishes to rob anyone or to take possession of any property without making due, proper and fair payment therefor. This latter course is one which I sincerely trust will not be adopted as it involves all the evils which years of experience have shown always attach to governmental operation of enterprises of this nature.

The very best results to the community, to those who pay for the service rendered, will as always be found in private ownership, where this ownership, while being regulated along proper lines, is still allowed full scope for the exercise of ingenuity and enterprise; and in order to do this they must be allowed, as I have previously stated, not only a standard return for the capital invested in other enterprises of any nature at all similar, but in addition to this some fair, reasonable allowance to compensate for the exercise of painstaking continuous industry, ingenuity and enterprise.

### Mr. Witt Declines

**Flatly Refuses Buffalo Designation Which Would Have Made Him a Partisan Representative**

Peter Witt, Cleveland, Ohio, has declined to serve as the representative of the city of Buffalo on the board of arbitration which will attempt to formulate a plan whereby the International Railway, Buffalo, will be placed under municipal control. Mr. Witt declined the designation of the City Council for three reasons; first because of his present work for the Philadelphia (Pa.) Rapid Transit Company; second, his tentative engagement to undertake work of a similar nature for another city, and, third, because he was asked to be the city's partisan representative on the board instead of being asked merely to serve as an impartial member of the board. James E. Allison, Jr., St. Louis, will be the company's representative on the board. So far there has been nothing like agreement on the part of the representatives of the city with respect to a successor to Mr. Witt.

#### HOPE IN ARBITRATION

How long the International Railway can continue to operate under a 5-cent fare is beginning to be a serious question with company officials. The arbitration proceedings hold out some hope that a permanent agreement can be reached between the city and the company, but a clause in the arbitration agreement provides that either side can reject the final report of the board. Thus after months of delay it would be possible to disregard the final valuation of the company's properties within the city to be used as the basis of an agreement whereby the city will participate in control of the railway.

On May 1 the company will have interest to pay on its 5 per cent refunding and improvement bonds. Whether or not it can again borrow sufficient money to pay the interest is a question.

#### BEHIND IN ITS TAXES

The International Railway is now face to face with still another problem. It must raise \$323,049 to pay municipal taxes. Of this amount \$259,330 represents the special franchise tax and \$63,718 the tax on its real estate within the city of Buffalo. The municipal authorities have served notice on the company that unless the taxes are paid March 1, a penalty of 5 per cent will be added and its property advertised for sale. The taxes have been due since July 1, 1918. Under the law unless the taxes are paid, the property can be sold by the city to the highest bidder on May 1, 1919.



A \$211,000,000 Port Plan

Electrification Would Play an Important Part in Mr. Lindenthal's Proposal for New York

Gustav Lindenthal, consulting engineer and builder of the Hell Gate Bridge at New York, presented before the New Jersey-New York Port and Harbor Development Commission on Feb. 13 his solution for the transportation problems between New York and New Jersey entering into the general port development project.

The plan proposed by Mr. Lindenthal would entail an expenditure of more than \$200,000,000. It would have as its dominating feature the long-discussed North River Bridge, between the New Jersey shore and Manhattan, at Fifty-seventh Street. It includes a proposed solution of the West Side problem presented by the New York Central Railroad tracks, to take the form of an elevated railroad. It proposes also a great classification yard in New Jersey, in the meadows back of the cities along the Hudson shore, and a union passenger terminal in Manhattan, at Fifty-seventh Street and Tenth Avenue.

ESTIMATES OF COST OF THE COMPONENT PARTS OF THE PROJECT

Double track belt railroad, from near Perth Amboy to Undercliff terminal on the Hudson, with switchyards at intersection with railroads, about 35 miles long	\$20,000,000
Classification yard in Jersey meadows and approaches to North River Bridge	15,000,000
Multiple track high level bridge over North River	75,000,000
West Side elevated railroad in Manhattan, eight tracks, with stations and market halls, 4 1/2 miles long	15,000,000
A pair of tunnel tubes under North River at Battery Place to Communipaw	12,000,000
Connection with New York Central going north at Fifty-seventh Street	5,000,000
Union station in Manhattan... Moving (conveyor) platforms under Fifty-seventh Street	25,000,000
A pair of tunnel tubes at Greenville, with yards and approaches	5,000,000
Audubon tunnel and bridge over Harlem River, including right-of-way	14,000,000
Power plant equipment and locomotives	5,000,000
	20,000,000
Total	\$211,000,000

There would be a marginal railroad along the West Side of Manhattan, with a freight discharging and loading station every half mile; a belt railroad in New Jersey similar to that proposed by the Port Commission's engineers, but taking in Perth Amboy and having a tunnel connection with Staten Island, this link leading to another tunnel connecting with Long Island and enabling the linking up of railroads north and south of Manhattan.

Other features of the project are a freight tunnel from the Battery to Jersey City, forming a loop over which, by gravity, freight cars brought over the proposed high level general traffic bridge could be sent back to the mainland. Another loop would take the proposed marginal railroad entirely around Manhattan, and a short con-

necting railroad to link the New York Central's main line with its Putnam and Harlem divisions northwest of the city, in suggested. The Manhattan loop and the Putnam-Harlem link, however, are only tentative features.

Mr. Lindenthal pointed out that while the present time is not propitious for construction, on account of the high prices of material, the work of studying and preparing plans should commence at once, likewise the negotiations with the railroads, which will have to be shown that the plan will produce ultimately a very large saving over present methods.

Further Negotiations Futile

Detroit Commission Rejects Counter Leasing Proposal of Railway—Will Map Out a Future Course

Mayor Couzens and the Street Railway Commission of Detroit, Mich., have rejected the rental proposal in a letter to Frank W. Brooks, president of the Detroit United Railway. Mr. Brooks had offered a plan for the company that the city rent the lines at an annual rental of \$2,010,000 a year, based on the company's valuation of \$33,500,000. This was in the nature of an alternative for the purchase proposal from the city which was regarded by the company as unfavorable. The following communication has been sent to Mr. Brooks.

At a meeting of the Board of Street Railway Commissioners, held in the Mayor's office to-day (Feb. 22) at 10 a. m., it was directed that the following reply to your proposal of Feb. 18 be addressed to you: This commission has carefully considered your letter of Feb. 18. It will be useless, apparently, for us to discuss with you the question of valuation of the property because you advise us that your company, unanimously, concludes that the price we offered you was "wholly inadequate," and you further make the comment that a fair valuation of the property would involve fixing the reproduction value of the property on the basis of the average price of material, labor, etc., over a period of five years immediately preceding this date. That is, of course, your opinion of a fair valuation, but that is not our opinion, because the property has not been replaced or anywhere near so in a period of five years. We are firmly of the opinion that the offer we have made is entirely fair and adequate.

As we stated to you during our meetings, the amount of money that you have put into the property is not a factor in the discussion, because you elected to put it in on the streets of Detroit at your own risk, where your franchises had expired and, therefore, of necessity had to take your chances, and if since then your property had deteriorated in value through obsolescence and depreciation, the city should not be asked to compensate you for it. This, so far as valuation is concerned.

Secondly, we have considered your suggestion of leasing the property to the city and, in view of the past experience the city has had, we must respectfully reject the suggestion in its entirety.

Thirdly, we have also considered your final suggestion to proceed under an arrangement to be made to construct the several extensions and beg to advise that under no circumstances are we willing to consider any such plan.

In view of the fact that the many efforts of the city to reach amicable adjustment with the Detroit United Railway during a period of more than twenty-five years have resulted in nothing tangible and your rejection of the city's last offer to purchase its property, it seems to the commission that further negotiations will be futile.

The commission announced that on Feb. 25 it expected to make public a statement about its future action.

New Deal in Akron

Franchise Proposal Which Includes Fare Increase Meets with Favor of City Officials

Director of Service Morse of Akron, Ohio, has presented recommendations to the City Council for a revised franchise for the Northern Ohio Traction & Light Company, with a rate of fare of six tickets for 35 cents and 6 cents cash, provided that an agreement be reached on service and betterments. When the earnings reach 7 per cent on the appraised value as set out by Hagenah & Erickson in their recent report, the rate of fare is to be reduced.

Mayor I. S. Myers said the plan appears to be workable and that he will sign it, if passed. The city, he said, needs extensions and better service. The measure may be repealed if it is found that the expected results are not being secured. Officials of the company, it is said, have tacitly agreed to the proposed plan, which is set out as follows:

1. Six-cent fare with six tickets for 35 cents.
2. Appraisal of power plant and electric power stations to be made at city's expense, to fix rates for current.
3. N. O. T. to pay the city \$5,500, covering the cost of the Hagenah & Erickson survey.
4. Surface survey to be made at joint expense of city and N. O. T. to (a) Recommend changes in rerouting, number of cars, schedules, etc. (b) Recommend regulation of jitneys. (c) Recommend extensions.
5. That N. O. T. make a monthly report to the city of its earnings, according to the system used by Hagenah & Erickson.
6. Repairs of paving and street opening within N. O. T. "devil strip," to be made by the city and charged to the company.
7. Future track construction of N. O. T. to be of the best standard practice and must be approved by the city, N. O. T. to pay the costs of city inspection.
8. Extra cost of street cleaning due to N. O. T.'s use of sand shall be charged to the company.
9. N. O. T. to replace tracks in 1919 as follows: (a) East Market Street from Case Avenue to Cambridge. (b) West Market Street from Corson to Portage Path. (c) Repair South Main Street track from Long Street to Ira Avenue and Thornton to Crosier.
10. (a) Build a single or double-track line on West Exchange from Five Points to Della Avenue. (b) Renew the present line on Manchester Road from South Street to the corporation limits.
11. Whenever company reports for three consecutive months show earnings of 7 per cent, the company shall proceed immediately on construction work on extensions as recommended as a result of the surface survey. This 7 per cent shall be on appraised value of the system of \$4,810,840, as reached in the Hagenah & Erickson report.
12. The company shall set aside 3 per cent of gross earnings monthly into a sinking fund which shall be used for betterments and replacements, so that the property will not be allowed to run down.
13. When reports show that the company has earned in excess of 7 per cent for three consecutive months the rate of fare shall be adjusted downward to bring it to a 7 per cent basis. If it develops later that the new rate does not produce sufficient revenue to earn 7 per cent, the rate may be readjusted upward again. Any excess over 7 per cent earned by the company is to go into the sinking fund.
14. The service director, with the approval of the Mayor shall appoint a commissioner of street railways who shall be paid by the city not to exceed \$5,000 a year, and the city reimbursed for this salary by the traction company. The N. O. T. shall provide free office room and clerical help for him.
15. The city to reserve the right to repeal the measure after one year in case it is not satisfactory, in which case the N. O. T. will operate under the present franchise agreement.



## Likes One-Man Car

Secretary of Bridgeport Chamber of Commerce Indorses Operation by Connecticut Company

The Chamber of Commerce of Bridgeport, Conn., thinks well of the safety-car line put in operation on Feb. 2 and described in the issue of this paper for Feb. 15. In a recent letter replying to an inquiry from the Chamber of Commerce of Norfolk, Va., M. B. Russell, assistant secretary of the Bridgeport Chamber, says in part:

While the Birney type one-man car has been in operation in Bridgeport for a comparatively short time, it now seems as if it would be in a fair way of solving our very serious transportation problem, and I think that no city having a similar problem would make a mistake in adopting it, especially where streets are narrow and congested. The cars here are running on one line, which comprises a portion of the wealthier residential section, and at the other end the working population, to a very considerable extent, and it has already built business in both sections. Cars are operated on a five-minute headway and are making an average rate of  $8\frac{1}{2}$  m.p.h. One mile of the route is through what we believe to be the most densely congested traffic in New England.

The cars are exceedingly elastic in traffic, as they stop quickly and start with the same speed as a jitney, if not faster. This operation is practically cutting the former headway in two and the public seems to be mighty well pleased with the cars. The employees of the Connecticut Company are also pleased with the cars, having bid in all the runs and are so enthusiastic over them that motormen and conductors of long service have applied for assignment to this line when more cars are added. The company is paying the men 5 cents an hour more for the operation of these cars, which will mean a better grade of employees. The operation of the cars has improved business on the line, and a rather unique testimonial came to my attention the other day from a man who had formerly used his automobile in going to and from his office in the center of the city. He states that he finds the Birney cars quicker and more comfortable as a means of transit and he now leaves his car in the garage and uses the Birney car. It seems good policy where the installation of these cars is anticipated to replace the large cars in the ratio of three for two and that attention should be given to the matter of public co-operation to the extent of having the exact change ready for payment of fare. This has been accomplished here through a public educational campaign, with very excellent results and the trolley company has had to put on additional help to carry the silver to the bank, whereas formerly it came in the form of bills, which without further comment is an indication of the added earning capacity of these cars. They have apparently not increased the accident rate and by the quickness of operation have to a considerable extent alleviated traffic congestion of other vehicles.

## Returned Soldiers Demand Recognition

Toward the end of January, the city of Winnipeg, Man., passed through a very unusual and unpleasant experience. On Jan. 27 returned soldiers to the number of 2000 under the cry "Out with the alien enemies" drove all those suspected of Bolshevism to cover and did \$30,000 damage to general property. Then followed a general demand upon all employers of labor by the returned soldiers for the discharge of alien enemies in their employ.

The heads of all the large industrial firms in the city were approached by the returned men. The ultimatum was to clear out all the alien enemies within forty-eight hours. As many hundreds of such men are employed in

Winnipeg, the situation became very threatening. Finally the returned soldiers and the employers got together with the result that by Feb. 4 returned men were being placed in positions in all industries as rapidly as possible.

Not once during the heat of the moment did the returned men have anything to say against the Winnipeg Electric Railway, the largest individual employer of labor in the city. This was undoubtedly due to the educational campaign A. W. McLimont, general manager, had launched prior to the outbreak by the returned men. On Jan. 25 Mr. McLimont issued a poster which was placed prominently on railway premises and advertised elaborately in the local newspapers. At the same time Mr. McLimont gave orders for the flying of a returned soldiers' flag from the top of the company's building. The figures 300 are in blue, and represent the number of returned soldiers in the company's employ. The border of the flag and the maple leaves are in red, while the background of course is white.

Through the advertising and other publicity, the returned soldiers knew exactly where the Winnipeg Electric Railway stood with regard to its employees, and its treatment of the returned men. A full page in the *Public Service News*, the organ of the railway, distributed on the street cars, was devoted to a review of the efforts of the Winnipeg Electric Railway to take care of the returned soldiers. It pointed out that no fewer than 118 former employees who enlisted had been reinstated. Another huge flag hangs over the door to the company's downtown offices. The one being flown from the flag pole is illumined at night by a powerful floodlight.

## Cincinnati Preparing for Work

Representative Federman has prepared a bill which, if made a law, will temporarily release the city of Cincinnati, Ohio, from the payment of a rental of \$32,000 a year for the use of the bed of the old Miami & Erie Canal as a part of the roadbed for the rapid transit loop. It is probable that construction work would have been begun on the rapid transit line before now, had it not been for the intervention of the war. The payment of rental has imposed a burden upon the city, from which its officials feel that it should be relieved.

W. C. Culkins, director of street railways, has asked the Cincinnati Traction Company to reduce its running time on several of the long routes and also to shorten the layovers. It is said that cars are held at the ends of some of the routes for thirteen minutes, when the union contract in no instance calls for more than seven.

The Cincinnati Traction Company has agreed to purchase 2 miles of track belonging to the Interurban Railway & Terminal Company, between Norwood and the northern boundary of Kennedy Heights. The price is \$36,000. This

was done in order that the company might comply with the city's request for an extension of service to Pleasant Ridge and Kennedy Heights. Negotiations are now in progress as to terms for operating interurban cars over this section of track and the business the interurban line will lose through the sale to the city line.

## All Is Harmony in Boston

The trustees of the Boston (Mass.) Elevated Railway after a conference with leaders of the union on Feb. 20, issued a "joint statement" declaring the trustees and the union men were in perfect harmony, were working for the best possible operation of the system, and would continue so to work.

The statement issued after the adjournment of the conference reads:

At a meeting held this morning between the trustees and Messrs. Vahey, Higgins and Timmins, representing the carmen's union, the parties were in entire harmony.

The statement of the chairman of the board of trustees before the legislative committee said nothing more than that the trustees would endeavor, when any question arose, to make an equitable adjustment on the wage question with their employees.

Both parties are now bound by an award of the National War Labor Board, which will end when peace is declared by executive proclamation. Until that time, neither party can take up the wage question.

They are all assured it will be taken up in a fair and just way whenever an opportunity arises, if it does.

The trustees made no suggestion that the wages should be changed from the War Board award. The relations between the trustees and the employees are perfectly harmonious, and the men are working in entire co-operation and sympathy with the efforts of the trustees to give better service under the public control act.

## Public Service Accepts Collective Bargaining

The Public Service Railway on Feb. 26 announced its acceptance of the principle of collective bargaining, as approved by the National War Labor Board. Notices to this effect were sent to the employees of the several departments. The plan to be followed is similar to that used by the Philadelphia Rapid Transit Company.

To secure closer co-operation the company is giving the employees an equal voice in the settlement of grievances or questions pertaining to working conditions. All such matters will be handled by committees, one-half the members being elected by the employees and the other half named by the company. Arbitration is provided in the case of a deadlock, and if the arbitrators cannot be agreed upon, the Public Utility Commission of New Jersey, where the company operates, is to be asked to act, its decision to be final.

The company also announced a new Co-operative League to take the place of its present welfare plan. Membership will carry with it \$1,000 life insurance and sick benefits of \$2 a day for not exceeding ninety days in a year. The league will be directed by a co-operative council made up equally of employees and company representatives. Membership in the league is voluntary, and no restrictions are imposed upon affiliation with any union.



## News Notes

**Service Resumed in Butte.**—Service on the Butte (Mont.) Electric Railway, which was suspended on Feb. 10, when the men refused to take out their cars because of alleged threats by striking miners, was resumed on Feb. 15.

**State Will Report on Electric Railways.**—Both Houses of the General Assembly of Connecticut have passed a bill providing for the appointment of a commission to inquire into the electric railway situation in the State and make a report early in April.

**Preparing for Service-at-Cost.**—The city of Muskogee, Okla., will soon vote on an amendment to the city charter providing for a public utilities board of five members, to be elected by the people to serve without pay and to have control of all public utilities. This is said to be an initial step toward securing service-at-cost franchises for the utilities.

**Viaduct Contract Signed.**—Mayor Cowgill of Kansas City, Mo., has been authorized by the Council to sign a contract with the Kansas City Railways under which that company will operate its cars over the Inter-City Viaduct. The rental agreed upon for Kansas City's share of the viaduct was \$3,360 a year. The contract will run until Dec. 19, 1922.

**Increase for Municipal Railway Employees.**—An increase of 50 cents a day to trackmen and car repairmen of the Municipal Railway, San Francisco, Cal., has been approved by the public utilities and finance committees of the Board of Supervisors. The increase will add \$23,739 to the annual payroll of the municipal lines. Trackmen have been receiving \$4 a day and repairmen \$4.50.

**Favors Loan for Mexican Rehabilitation.**—Elmer R. Jones, newly-elected president of the express firm of Wells, Fargo & Company of Mexico, says that Mexico needs about \$400,000,000, mostly for the rehabilitation of railroads and tramways and harbor development. He believes the value of commerce between the United States and Mexico in a single year would justify the loan.

**Wage Hearing Concluded.**—The hearings on the application of the employees of the Pacific Electric Railway, Los Angeles, Cal., for increased wages were concluded on Feb. 11. It is estimated that the transcript of the testimony will contain 680,000 words. The typewritten summary was to have been completed by Feb. 21. Ten days are then allowed for the attorneys of the railway company to submit a written brief.

**Licenses for Motormen Opposed.**—Labor and the transit companies of New York State on Feb. 19 opposed the Link bill which provides for the State licensing motormen on surface, subway and elevated railroads, and, further, for compulsory arbitration of labor differences. One representative of the railways said that the law now demanded that the companies employ only competent men, and that if the bill were made a law the companies would simply refuse to accept responsibility for the men employed.

**Would Label Cars for Identification.**—A committee of the Senate of New York is working on a modification of Senator Charles E. Russell's bill which seeks to establish the ownership of a street, elevated or subway car upon which a personal injury is received. Senator Russell introduced a bill which would force a corporation to carry the name of the operating company (the company that is held responsible in negligence actions) on every car. A compromise bill is being worked which would require the corporations to file schedules of all cars with car numbers in the county clerk's office.

**Arrests in Dynamiting Case.**—Operatives from the Department of Justice have arrested Curtis J. Rees and Lawson W. Millwee, following an investigation of the dynamiting of the carhouse of the Kansas City (Mo.) Railways on the night of Dec. 29, when several persons were injured. The two men were arraigned before United States Commissioner Arnold, but declined to enter pleas before having had time to consult attorneys. The specific charge against the men was conspiring to violate the federal explosive act, a war statute prohibiting the possession of explosives without a federal license.

**Would Elect Jersey Commissioners.**—Election of the public utility commissioners by the people instead of appointment of them by the Governor is provided for in a bill which will be introduced in the Senate of New Jersey. The measure proposes the creation of six utility districts, each of which will be under control of a commissioner, who will be elected by the people living in that district. The bill provides that the new elective board members shall have the same qualifications, powers, privileges and compensation and be subject to the same limitations as govern the present appointive board.

**Will Reinstate All Its Men.**—Every star in the service flag of the Connecticut Company, New Haven, Conn., will be "made good," says a statement issued from the executive offices of the company. When the armistice was signed there were 524 employees of the Connecticut Company in the military and naval service of the United States. This was about 12 per cent of the entire personnel of the company. Up to Feb. 21, 118 of these men had been returned to their old jobs. Their old jobs, or other work, are waiting the return of the remaining 406 employees of the company who are still in the service.

**Fewer Women Employees in Brooklyn.**—Since November when the armistice was signed there has been a decrease of 229 women employees in the service of the Brooklyn (N. Y.) Rapid Transit Company. On the surface car lines in November there were 222 and now there are only 144, a drop of seventy-eight. On the elevated and subway, eastern division, there were 141 and at present only ninety-five and on the elevated and subway, southern division, there were 475 and a few days ago 370, a decrease of 105. This does not necessarily mean that they all quit, as the women are subject to the same regulations as men in regard to discipline and efficiency.

**Electrification Bill Killed.**—The Senate of Washington recently killed a bill designed to give the Chicago, Milwaukee & St. Paul Railway permission to electrify its line over the tracks of the Columbia & Puget Sound Railroad, from Cherry Valley into Seattle. For this distance, the Milwaukee uses the Columbia Company's tracks under a contract providing that, for a certain sum, the Milwaukee may operate its steam trains over the rails. When the contract was made the Milwaukee officials had no idea they would later want to electrify the lines. The smaller road has asked the sum of \$12,000 a mile before granting permission to electrify. The Milwaukee refused this proposition and introduced a bill in the Senate, giving the company power to condemn the line of the other railway. The Senate committee asked the indefinite postponement of the bill.

**Compromise on Commission Proposed.**—Senators Foley, Walters, Sage and Thompson conferred recently on the proposition of what to do with the two Public Service Commissions in New York State. It was agreed, although not definitely, to permit the Governor to name a member of the First District Public Service Commission who should complete the subway system as planned and who would in effect be a rapid transit commissioner. Other than this it is understood the commission for the first district as at present constituted will stand. The law is to be amended in several particulars. The republicans insisted on retaining the two commissions.

## Program of Meeting

### New York Electric Railway Association

The president and executive officers of the New York Electric Railway Association have decided not to hold a quarterly meeting of the association this year, which heretofore has been held in the month of March.

This action was taken on account of the financial stringency confronting the electric railways throughout the State, and the further fact that a meeting of the New York association at this time would come too close to the mid-winter meeting of the American Electric Railway Association.



# Financial and Corporate

## Operating Expenses Soaring

Western Group Shows Big Decline in Net, but One Eastern Group Has Increase

The outstanding features of the operating returns of electric railways for November, 1918, as reported to the information bureau of the American Electric Railway Association, are the accelerated rise in the cost of operation and the depressing condition of affairs prevailing in the Western District. While the revenues, with the exception of the Western District, showed an encouraging increase as compared with the corresponding month of 1917, the margin of profit thus created was more than eaten up by the abnormal increase in operating expenses. The result was a further decrease in the net earnings and operating income.

The decline of the influenza epidemic, which had such a disastrous effect upon the October earnings, was reflected in the return to an almost normal increase in revenues throughout the country with the exception of the Western District. A slight actual decrease in the volume of business showed the lingering of the plague in that section of the country.

### COSTS OUTDISTANCE REVENUES

The United States as a whole showed an increase of 8.11 per cent in operating revenues as compared with November, 1917. Operating expenses increased 18.88 per cent, and as a consequence net earnings fell off 13.80 per cent. Among companies reporting taxes the showing was not quite so favorable; the net declined 18.77 per cent, taxes increased 1.59 per cent and

the operating income fell off 25.53 per cent. The operating ratio for the country increased from 67.22 in November, 1917, to 73.92 in November, 1918. For companies reporting taxes the increase was from 70.20 to 77.59.

The showing of the Western District was by far the most unfavorable. Accompanying the decline in the operating revenues noted above was a more than average increase in the expenses, 25.53 per cent, producing a falling off in the net of 50.76 per cent. This district also suffered the largest increase in taxes. For companies in the West reporting taxes the returns showed a falling off in revenues of 2.22 per cent, an increase in expenses of 25.97 per cent and a decline in net of 51.32 per cent. Taxes increased 3.96 per cent, producing finally a decrease in the operating income of 62.33 per cent. The depressing state of affairs in the West is further shown by the operating ratio, which for the general group rose from 63.89 in 1917, to 81.85 in 1918, a high record even for the West.

### EASTERN DISTRICT BETTER

In the Eastern District the outlook was more favorable. The net earnings fell off 2.50 per cent, it is true, but when it is remembered that the district was probably still suffering in some degree from the epidemic, these figures become distinctly favorable. The increase in operating expenses was below the average increase for the country, while the increase in revenues was above it. If the companies reporting taxes were considered by themselves, the result would be an actual improvement for the month. The net earnings of these companies increased 1.13 per

cent, taxes remained stationary and the operating income increased 1.62 per cent.

In the Southern District the most remarkable feature was the extraordinary increase in operating expenses, 43.52 per cent. Although the district showed the largest increase in revenues, this advantage was more than wiped out, and the net earnings declined 24.11 per cent. The disproportionate increase in expense was also shown in the operating ratio, which increased from 55.81 per cent in 1917 to 70.49 per cent in 1918.

The returns are shown in detail in the accompanying table. They are classified according to the following geographical grouping: Eastern District—East of the Mississippi River and north of the Ohio River. Southern District—South of the Ohio River and east of the Mississippi River. Western District—West of the Mississippi River.

## Financial Applications Passed

The Public Utilities Commission of Illinois has received and acted upon a large number of petitions recently, most of which relate to the financial operations of the electric utilities of the State. The Jacksonville Railway & Light Company (Illinois Traction System) has been authorized to issue \$183,000 of first mortgage 5 per cent gold bonds. The Illinois Central Traction Company (Illinois Traction System) has been authorized to issue 6 per cent cumulative preferred capital stock to the amount of \$245,000 and general mortgage 6 per cent gold bonds to the amount of \$254,000. The Chicago, Ottawa & Peoria Railway (Illinois Traction System) has been authorized to issue \$576,000 of first consolidated and refunding mortgage 5 per cent gold bonds. The Northern Illinois Light & Traction Company has been authorized to issue \$90,000 of general mortgage 6 per cent gold bonds.

COMPARISON OF REVENUES AND EXPENSES OF ELECTRIC RAILWAYS FOR NOVEMBER, 1918 AND 1917

Account	United States				Eastern District				Southern District				Western District			
	Per Mile of Line			% Increase Over 1917	Per Mile of Line			% Increase Over 1917	Per Mile of Line			% Increase Over 1917	Per Mile of Line			% Increase Over 1917
	Amount, November, 1918	1918	1917		Amount, November, 1918	1918	1917		Amount, November, 1918	1918	1917		Amount, November, 1918	1918	1917	
Operating revenues.....	\$10,836,375	\$1,812	\$1,959	8.11	\$8,252,403	\$2,121	\$1,925	10.18	\$750,538	\$1,525	\$1,342	13.62	\$1,833,434	\$1,598	\$1,631	*2.08
Operating expenses.....	8,005,883	1,218	1,448	18.88	5,976,070	1,536	1,325	15.92	529,116	1,075	749	43.52	1,500,697	1,308	1,042	25.53
Net earnings.....	2,830,492	594	512	*15.80	2,276,332	585	600	*2.60	221,422	450	593	*24.11	332,737	290	589	*60.76
Operating ratio, per cent.....	1918, 73.92; 1917, 67.22				1918, 72.42; 1917, 68.83				1918, 70.49; 1917, 55.81				1918, 81.85; 1917, 63.89			
Av. No. miles represented....	1918, 5,530; 1917, 5,530				1918, 3,890; 1917, 3,891				1918, 492; 1917, 492				1918, 1,147; 1917, 1,147			

COMPANIES REPORTING TAXES

Operating revenues.....	\$7,136,136	\$1,834	\$1,698	8.01	\$4,848,582	\$1,916	\$1,717	11.59	473,085	\$1,838	\$1,649	11.46	\$1,814,464	\$1,630	\$1,667	*2.28
Operating expenses.....	5,536,038	1,423	1,192	19.38	3,721,182	1,470	1,276	15.20	329,943	1,344	924	45.45	1,484,913	1,334	1,059	25.97
Net earnings.....	1,600,098	411	506	*18.77	1,127,401	446	441	1.13	143,146	494	725	*31.86	329,551	296	608	*61.32
Taxes.....	496,257	128	126	1.59	339,824	133	133	0.00	39,452	161	162	*0.62	116,981	105	101	3.96
Operating income.....	1,103,841	283	380	*26.53	787,577	313	308	1.62	103,694	333	563	*40.85	212,570	191	507	*66.23
Operating ratio, per cent.....	1918, 77.59; 1917, 70.20				1918, 76.72; 1917, 74.32				1918, 73.12; 1917, 56.03				1918, 81.84; 1917, 63.53			
Av. No. miles represented....	1918, 3,890; 1917, 3,890				1918, 2,531; 1917, 2,531				1918, 246; 1917, 246				1918, 1,113; 1917, 1,113			

\*Decrease.



## Cincinnati Falls Back

**Inclement Weather and Loss of Men to Government Reduce Receipts \$273,263 From Previous Year**

The gross receipts of the Cincinnati (Ohio) Traction Company for the calendar year 1918 showed a decrease of \$273,263 or 4.8 per cent as compared to those of 1917. Operating expenses and taxes increased, and the net earnings under the newly revised partnership agreement with the city were only \$229,987 for 1918 as compared to \$885,668 for 1917.

It is well to point out that in the early part of 1918 weather conditions reduced riding to a great degree. Moreover, during the year the absence of 20,000 or more men in various branches of war work was felt.

The following statement of operation of the Cincinnati Traction Company for 1917 and 1918 includes the earnings and expenses of the Millcreek Valley Lines:

	1918	1917
Gross receipts—C. T. Co.	\$5,468,176	\$5,741,440
Gross receipts—M. C. V. lines.....	271,814	285,407
Total.....	\$5,739,992	\$6,026,847
Operating expenses—C. T. Co.	\$3,481,813	\$3,220,833
Operating expenses—M. C. V. lines.....	218,003	217,888
Total.....	\$3,699,816	\$3,438,721
	\$2,040,176	\$2,586,126
Taxes, except city of Cincinnati—C. T. Co.....	\$486,331	\$419,700
Taxes, except city of Cincinnati—M. C. V. lines.....	21,334	17,584
Total.....	\$507,665	\$437,284
	\$1,532,510	\$2,150,842
Rentals—C. T. Co.....	\$1,134,337	\$1,134,337
Rentals—M. C. V. lines.....	100,600	100,600
Totals.....	\$1,234,937	\$1,234,937
	\$297,573	\$915,905
Interest on equipment notes.....	\$47,021	\$29,050
Interest on floating debt.....	20,564	1,186
Total.....	\$67,585	\$30,236
Net earnings under ordinance.....	\$229,988	\$885,669

Only one change was made in the directorate at the recent annual meeting. C. J. Livingood was elected to succeed Julius Fleischmann, who retired because of his leaving Cincinnati.

## Common Stock Bankers' Shares

Henry L. Doherty & Company, New York, N. Y., and Montgomery & Company, Philadelphia, Pa., as syndicate managers, are forming a syndicate to underwrite 200,000 Cities Service Company common stock bankers' shares.

Each ten bankers' shares represent one share of Cities Service Company common stock which will be deposited with the Bankers' Trust Company as trustee under a depository agreement. Dividends paid in common stock on the deposited shares will be sold and dividends on the bankers' shares will be paid monthly in cash, the first dividend to be paid April 1 to bankers' shares

of record of March 15. The issue of these bankers' shares was made in response to a general request that some method be devised whereby Cities Service Company common stock would be obtainable in smaller units than the shares of \$100 par value, which are now selling above 340.

## New Bay State Control May 1

It is expected that the board of public trustees will take control of the Eastern Massachusetts Street Railway, the successor company to the Bay State Street Railway, on May 1. The Bay State Street Railway reorganization plan is dated Jan. 9. The public control act directs the trustees to co-operate with the security holders in arranging the transfer of the Bay State property to the new company, and requires their approval of the amount of capital of the new company. According to the Boston News Bureau the new company will probably have about \$50,000,000 of capital, which on a 6 per cent basis would call for an annual interest and dividend charge of \$3,000,000.

One of the formalities to be complied with before the Bay State Street Railway property can be sold to the new company is an affirmative vote of two-thirds in interest of each class of Bay State Street Railway stock. Another is a requirement of the act that Bay State Street Railway security holders must put up \$1,000,000 for securities of the new company to be used in rehabilitation of its lines or for other corporate purposes; also provision must be made for sale of serial bonds to the amount of \$2,500,000. Arrangements for this financing will be included in the reorganization plan.

## Correction Regarding Portsmouth, Dover & York Railway Service

C. H. Nottage, assistant to the general manager of the Portsmouth, Dover & York Street Railway, Portsmouth, N. H., has written to correct a statement made recently in this paper about the company abandoning service. Mr. Nottage says:

In the issue of the ELECTRIC RAILWAY JOURNAL dated Feb. 8, under the heading of "Into Hiding for the Winter," I notice that the Portsmouth, Dover & York Street Railway is out of business until April 30, 1919.

With due respect to the editor of the York Transcript, I wish to correct this statement, for we are maintaining our regular schedule from Portsmouth to Dover and from Dover to South Berwick and Portsmouth to Kittery Point, serving the Navy Yard at Kittery, Me., and two ship-building plants, one at Portsmouth and one at Newington, N. H. The branch that is not in operation is from Rosemary Junction to York Beach.

W. G. Meloon, the receiver, says:

We have no intention of discontinuing operation of the York line permanently, which should be evident to the York Transcript, as during the last year we joined the town of York in entirely rebuilding a 600-ft. bridge across the York River on the Dover and York Beach division and also the draw over the York River on the Portsmouth and York Division.

The order of the court reads "from Jan. 20 to May 1, 1919." The property is being improved and we have to make unusual efforts to handle the large number of Navy Yard and shipyard workmen.

## Boston Deficit \$219,629

**Cost Per Passenger on the Boston Elevated Railway in January Was 8.97 Cents and Receipts 8.17 Cents**

The financial report for January, 1919, made public by the trustees of the Boston (Mass.) Elevated Railway, shows a deficit of \$219,629 as compared to a deficit of \$149,903 for December, 1918. The cost for each passenger carried during the month was 8.97 cents, of which labor cost constituted 4.13 cents. The revenue passengers numbered 27,517,066, and the receipts per revenue passenger were 8.17 cents.

### \$3,292,294 DEFICIT IN SEVEN MONTHS

The deficit for the seven months ended Jan. 31, 1919, was \$3,292,294. The total receipts for this period were \$13,702,326. The total cost of service was \$16,994,620. The cost of service as compared to the corresponding seven months of the previous year showed an increase of \$5,471,075. The chief items entering into this increase are as follows:

Wages.....	\$2,251,445
Coal (8246 tons additional).....	59,229
Coal (increased cost).....	346,083
Insurance.....	43,752
Depreciation.....	969,000
Contracts, material and other operating expenses.....	615,785
Rent of subways and tunnels.....	287,297
(Dorchester tunnel)	
Dividend—rentals under the act.....	775,232

The statement of the Boston Elevated Railway for the month of January is as follows:

### RECEIPTS AND COST OF SERVICE OF BOSTON ELEVATED RAILWAY TO JANUARY, 1919

Receipts:	
From fares.....	\$2,189,323
From special cars, mail pouch service, express and service cars.....	7,552
From advertising in cars, on transfers, privileges at stations, etc.....	24,244
From other railways for use of tracks and facilities.....	4,366
From rent of buildings and other property.....	7,923
From sale of power and other revenue.....	10,550
Total receipts from direct operation	\$2,243,958
Interest on deposits, income from securities, etc.....	4,600
Total receipts.....	\$2,248,558
Cost of service:	
Maintaining track, line equipment and buildings.....	\$196,445
Maintaining cars, shop equipment, etc.....	230,514
Power (including 28,020 tons of coal at \$5.815, \$162,949).....	239,881
Depreciation.....	167,000
Transportation expenses (including wages of car employees, carhouse expenses, etc.).....	800,395
Salaries of administrative officers.....	6,895
Law expenses, injuries and damages and insurance.....	98,619
Other general expenses.....	76,752
Total operating expenses (of which \$1,135,210 represents wages).....	\$1,816,501
Taxes, proportion.....	77,351
Rent for leased roads (exclusive of subways).....	216,098
Proportion of rent of subways and tunnels to be paid to the city of Boston (exclusive of Cambridge Subway owned by company).....	124,828
Interest on Boston Elevated Railway bonds and notes.....	111,104
Miscellaneous items.....	2,325
Proportion of dividend rentals under acts of 1918.....	116,997
Accrued interest on unpaid taxes.....	2,983
Total cost of service.....	\$2,468,187
Net loss for January.....	\$219,629



## Before a Special Master

St. Louis Receivership Case Will Be Conducted Before Former Supreme Court Judge

Henry Lamm, Sedalia, Mo., former Judge of the State Supreme Court, has been appointed by United States District Judge Dyer as special master, to take testimony in the receivership suit of John W. Seaman and other stockholders against the United Railways, St. Louis, Mo. The exact time and the place for the hearing have not been announced.

The appointment of a special master to hear the receivership case has been in prospect since Judge Dyer recently announced that he would not himself hear the testimony, as he did in the former case of the same character. Judge Dyer dismissed that case, by sustaining a demurrer.

After dismissing the original suit for a receivership and an accounting, Judge Dyer gave the petitioner leave to amend and refile the petition, and this was done. When the attorneys for the United Railways offered dilatory motions, Judge Dyer gave them four days to make an answer to the receivership petition, and this answer was filed on Feb. 7.

The chief allegations in the receivership petition were that the company's contracts for water power from the Keokuk dam cost \$400,000 a year in excess of a reasonable charge; that the practices of the company's legal department were wasteful, especially in the mill tax litigation; that the claim department is unreasonably costly; and that a system of interlocking directorates makes the company operate for the sole benefit of the North American Company, New York, N. Y., which controls the United Railways through that company's common stock.

A supplemental bill was filed in court recently, setting forth reasons for the appointment of a receiver, in addition to those contained in the petition already before the court.

## Third Avenue Earnings

Revenues Are Back to 1913 Basis, But Expenses Are \$1,000,000 More Than in That Year

The strike of 1916 on the lines of the Third Avenue Railway, New York, N. Y., and the competition of subway and elevated extensions so abnormally distorted the operating figures for the fiscal years ended June 30, 1917, and 1918, that a comparison of results in the last two years would be of little value.

It may be remarked, however, that subway and elevated competition and other causes have reduced operating revenues practically to the 1913 basis, but the increased cost of labor and materials has increased operating expenses for 1918 approximately \$1,000,000 above those for 1913.

For the first six months of the fiscal

year ended June 30, 1918, it was found that there had been earned above operating expenses, taxes and interest on underlying bonds \$494,386. To preserve the company's credit in the face of constantly decreasing earnings combined with large and continued increases in the cost of operation, it was deemed necessary and advisable to set this amount aside to secure the proper, safe and adequate maintenance, equipment and operation of the road and to preserve its earning capacity.

INCOME STATEMENT OF THIRD AVENUE RAILWAY FOR YEARS ENDED JUNE 30, 1917 AND 1918

	1918	*1917
Operating revenue.....	\$10,234,988	\$8,972,648
Maintenance of way and structures.....	\$1,186,997	\$998,770
Maintenance of equipment.....	860,333	709,637
Depreciation accruals.....	.....	225,962
Power supply.....	940,255	781,086
Operation of cars.....	3,047,828	2,726,243
Injuries to persons and property.....	830,974	862,804
General and miscellaneous expense.....	468,532	983,338
Total operating expense.....	\$7,334,919	\$7,287,840
Net operating revenue.....	\$2,900,069	\$1,684,808
Taxes.....	836,098	794,450
Operating income.....	\$2,063,971	\$890,358
Interest revenue.....	158,847	164,925
Gross income.....	\$2,222,818	\$1,055,283
Deductions for interest, rentals, etc.....	2,679,322	2,677,609
Deficit for the period....	\$456,504	\$1,622,326

\* This period includes, and the figures reflect, the period of the strike in 1916.

For the last six months of this fiscal year, there was earned above operating expenses, taxes and underlying interest, the sum of \$175,910. This was less than 1 per cent, the minimum amount that can be declared payable as interest under the adjustment income mortgage. Furthermore, the reasons which influenced the directors to set aside the reserve of the previous six months for contingencies had become still more urgent, and, accordingly, the above amount was set aside for the same purposes.

## The Receiver's Dilemma

The second installment of back wages due on Feb. 1 to the employees of the Rhode Island Company, Providence, R. I., under an amended decree of the War Labor Board, has not yet been paid. It amounts to \$72,000. The third installment, which is also the final payment, is due on March 1. Receiver Frank H. Swan has petitioned the Superior Court for permission to make the payment due on Feb. 1, but to date the court has rendered no decision. A conference was held recently between Receiver Swan and the attorney and representatives of the union in the office of Presiding Justice Tanner of the Superior Court, as a result of which the union men are not appearing too sanguine of receiving the money due.

In addition to the sums due the employees for back wages, the Rhode Island Company owes the United Trac-

tion & Electric Company a balance of \$47,500 on rentals due on Dec. 24 and also \$180,000 due on Feb. 24, payment of the latter usually providing the funds for the payment of interest on bonds of the United Traction, but it is a foregone conclusion that the interest will not be paid at present.

Taxes due the city of Providence and the State of Rhode Island are other accumulated debts which confront the receiver and tend to increase the difficulties which he must solve with the aid of the court.

## Financial News Notes

**Would Issue Improvement Bonds.**—The Georgia Railway & Power Company, Atlanta, Ga., has filed an application with the Georgia Railroad Commission for permission to issue \$633,000 of refunding and improvement mortgage bonds, which are part of a total authorized issue of \$30,000,000.

**Dismantlement Completed.**—Thomas Flynn, who some months ago bought the property of the Bluffton, Geneva & Celina Traction Company, which formerly operated between Bluffton and Geneva, Ind., has shipped the rails and other iron and steel material to Shreveport, La., where they will be used in the construction of a new railroad.

**Plans to Reorganize Claremont Company.**—A bill is pending before the Legislature of New Hampshire proposing to grant a charter to the Claremont Street Railway, which is to take over the properties of the Claremont Railway & Lighting Company. In the meantime the company is being operated by a receiver. It is expected that it will be some weeks before the reorganization will be effected.

**Utah Lines Consolidate.**—At a recent meeting of the stockholders of the Utah-Idaho Central Railroad, Ogden, Utah, an agreement to consolidate the properties of the Utah-Idaho Central Railroad and those of Cache Valley Railroad, contained in a resolution adopted by the board of directors on Dec. 27, was ratified. The present officers were retained but the board of directors was reduced to nine members. A total of approximately 17 miles of trackage is added to the Idaho Central lines by the consolidation.

**Preparing for Bay State Reorganization.**—Friendly proceedings, designed to facilitate the reorganization of the Bay State Street Railway, Boston, Mass., now in the hands of a receiver, have been begun in the Federal Court in that city by the Old Colony Trust Company and the American Trust Company. The trust companies have filed bills in equity seeking foreclosure of the 4 per cent refunding mortgages of the Old Colony Street Railway and the



Boston & Northern Street Railway, which were merged into the Bay State Company in 1911. Judge Morton ordered the bills consolidated and set Feb. 28 as the date for a hearing.

**Reorganization Declared Operative.**—The reorganization committee for the Oakland & Antioch Railway, Oakland, Antioch & Eastern Railway and San Ramon Valley Railway, Oakland, Cal., has announced that the reorganization plan published in the *ELECTRIC RAILWAY JOURNAL* for Jan. 12, page 103, has been declared fully operative. The plan has been signed by fully 85 per cent of the security holders of the various classes, and the committee says it will proceed to carry the plan out in full. The plan, heretofore announced, provides for the formation of a new corporation to be known as the San Francisco, Oakland & Sacramento Railway, which will take over the reorganized properties.

**Bondholders Adjust Differences.**—An agreement has been reached between the rival committees representing holders of the 4 per cent collateral trust bonds of the International Traction Company, Buffalo, N. Y. Under the provisions of the agreement the local committee headed by Harry T. Ramsdell, president of the Manufacturers & Traders' National Bank, purposes to turn over the bonds it holds to the protective committee of which Elliott C. McDougal, president of the Bank of Buffalo, is chairman. All bondholders are now advised to turn over their securities to the protective committee. The interest payment due on Jan. 1, 1919, on the traction company's 4 per cent bonds was not met and the bondholders on March 1 will be in a position to start foreclosure proceedings.

**St. Joseph Valuation Figures.**—A study of the valuation by engineers for the Missouri Public Service Commission of the property of the St. Joseph Railway, Light, Heat & Power Company, reveals the book valuation to be \$11,714,197 and \$5,737,800 to represent the bare reproduction cost of the phys-

ical property as estimated by the engineers. Both valuations include not only the property of the railway in St. Joseph, but also of the heating, lighting and power plant. The valuation placed upon the railway property by the engineers is \$2,181,800. This represents the estimated cost of reproduction, less depreciation. As there are 48.84 miles in the St. Joseph system the average value per mile is \$70,000 according to the estimate of the engineers.

**Abandonment Prevented at Present.**—The Court of Appeals on Jan. 24 rendered an important decision in the case of the city of Bowling Green and Warren County against the Southern Traction Company preventing the defendant from disposing of its plant as junk. The court held that the railway was not compelled to operate its cars at a loss; that if the system, operating economically and efficiently, would not produce a fair income to its owners, the company could sell its plant and remove its rails and wires from the streets. If it could be determined, after a year under a receiver, that the system could not be operated except at a loss, the owners would then have a right to dispose of the property as junk, provided the streets were left in as good condition as when the rails were laid.

**Securities for Reorganization Approved.**—The Public Service Commission of Indiana has authorized the Evansville & Ohio Valley Railway and the Evansville Railways to issue securities in the amount of \$2,150,000 as follows: \$75,000 of 5 per cent thirty-year first and refunding bonds; \$750,000 of general mortgage thirty-year income bonds; \$150,000 of ten-year 6 per cent notes; \$200,000 of 6 per cent preferred non-cumulative stock; \$300,000 of common stock. The reorganizers asked for a common stock issue of \$1,000,000 but this was lowered to \$300,000. First mortgage bonds to provide funds to rehabilitate the property will be issued only under special separate authorization of the commission. The plans for the reorganization have been reviewed

previously in the *ELECTRIC RAILWAY JOURNAL*.

**Financial Readjustment Not Contemplated.**—Reports that a readjustment of the New York city transit situation is imminent, involving the granting of higher fares through legislative action, the refinancing of the local operating companies and the liquidation of the Interborough Consolidated Corporation, the holding company, have been denied by Theodore P. Shonts, president of the Interborough Rapid Transit Company. Mr. Shonts said: "There is no truth whatever in the story published regarding the readjustment of the Interborough affairs and the abolishment of the Interborough Consolidated Corporation, the holding company. We have no intimation of any plan of this character. We are asking for increased fares, not that we want to make any big profit, but want sufficient returns to warrant revenues on the basis which was promised us when we became a partner with the city."

**No Action on Interborough Dividend.**—The directors of the Interborough Rapid Transit Company, New York, N. Y., took no action on Feb. 25 regarding the quarterly dividend which was due for consideration. Interest on the Interborough-Metropolitan Company 4½ per cent bonds is dependent upon the dividend declaration of the Interborough Rapid Transit Company. It has been suggested in unofficial quarters that the April 1 interest payment on the Interborough-Metropolitan bonds might be paid out of surplus of the Interborough-Consolidated Corporation, but an advertisement in the New York papers of Feb. 28 noted the formation of a protective committee for the holders of the Interborough-Metropolitan Company collateral trust 4½ per cent bonds. This committee was formed in order that bondholders might be in a position to take concerted action if occasion should arise. The committee asked for deposit of bonds on or before March 31 with the Guaranty Trust Company.

## Electric Railway Monthly Earnings

### AURORA, ELGIN & CHICAGO RAILROAD, WHEATON, ILL.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Dec., '18	\$189,780	*\$177,213	\$12,567	\$38,844	†\$26,277
1m., Dec., '17	183,517	*139,407	44,110	35,625	8,485
12m., Dec., '18	2,140,210	*1,874,699	265,511	439,252	173,741
12m., Dec., '17	2,158,478	*1,557,664	600,814	428,516	172,298

### ATLANTIC SHORE RAILWAY, SANFORD, ME.

1m., Jan., '19	\$11,605	\$10,937	\$668	\$508	\$160
1m., Jan., '18	10,832	12,994	†2,162	484	†2,646

### BROCKTON & PLYMOUTH STREET RAILWAY, PLYMOUTH, MASS.

1m., Dec., '18	\$6,125	*\$8,250	†\$2,125	\$1,441	†\$3,566
1m., Dec., '17	8,910	*10,038	†1,128	1,318	†2,446
12m., Dec., '18	101,429	*\$116,317	†\$14,888	16,833	†\$31,721
12m., Dec., '17	124,316	*124,778	†462	14,755	†15,217

### CAPE BRETON ELECTRIC COMPANY, LTD., SYDNEY, N. S.

1m., Dec., '18	\$51,173	*\$37,181	\$13,992	\$6,632	\$7,360
1m., Dec., '17	46,120	*27,356	18,764	6,535	12,229
12m., Dec., '18	513,005	*\$392,410	120,595	78,506	42,089
12m., Dec., '17	464,081	*298,247	165,834	78,652	87,182

### EASTERN TEXAS ELECTRIC COMPANY, BEAUMONT, TEX.

1m., Nov., '18	\$95,506	*\$63,397	\$32,109	\$14,535	†\$17,879
1m., Nov., '17	75,990	*39,308	36,682	12,109	†27,465
12m., Nov., '18	1,105,724	*\$641,632	464,092	161,992	†\$312,552
12m., Nov., '17	928,068	*\$512,588	415,480	134,441	†\$297,874

\* Includes taxes. † Deficit. ‡ Includes non-operating income.

### JACKSONVILLE (FLA.) TRACTION COMPANY

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Dec., '18	\$98,461	*\$76,999	\$21,462	\$17,050	\$4,412
1m., Dec., '17	69,590	*44,919	24,671	15,866	8,805
12m., Dec., '18	945,568	*709,667	235,901	199,066	36,835
12m., Dec., '17	698,123	*469,712	228,411	188,896	39,515

### NORTHERN TEXAS ELECTRIC COMPANY, FORT WORTH, TEX.

1m., Dec., '18	\$249,511	*\$167,163	\$82,348	\$27,283	\$56,447
1m., Dec., '17	294,207	*147,871	146,336	28,950	†\$126,969
12m., Dec., '18	2,929,759	*1,883,833	1,045,926	337,788	†\$282,138
12m., Dec., '17	2,582,113	*1,445,663	1,136,450	348,744	†\$16,745

### PENSACOLA (FLA.) ELECTRIC COMPANY

1m., Dec., '18	\$50,756	*\$41,520	\$9,236	\$9,293	†\$57
1m., Dec., '17	35,081	*20,282	14,799	7,829	6,970
12m., Dec., '18	506,050	*360,382	145,668	99,923	45,745
12m., Dec., '17	350,458	*203,680	146,778	93,668	53,110

### SAVANNAH (GA.) ELECTRIC COMPANY

1m., Dec., '18	\$110,394	*\$92,320	\$18,074	26,319	†\$8,245
1m., Dec., '17	92,611	*58,317	34,294	24,832	9,462
12m., Dec., '18	1,182,891	*\$856,151	326,740	302,947	23,793
12m., Dec., '17	968,173	*\$645,592	322,581	290,549	32,032

### TAMPA (FLA.) ELECTRIC COMPANY

1m., Dec., '18	\$103,665	*\$56,538	\$47,127	\$5,293	\$41,834
1m., Dec., '17	87,952	*\$50,019	37,933	5,085	32,848
12m., Dec., '18	1,062,546	*\$620,276	442,270	61,433	380,837
12m., Dec., '17	1,001,311	*\$563,540	437,771	56,118	381,653



# Traffic and Transportation

## Columbus Wants Increase

**New Management Renews Fare Plea With Imposing Array of Evidence to Prove Its Needs**

Charles L. Kurtz, president of the Columbus Railway, Power & Light Company, Columbus, Ohio, made application to the City Council on Feb. 18 for permission to increase the rates of fare from eight tickets for a quarter to 5 cents cash fare, with transfer, and six tickets for a quarter without transfers. He stated that the new rates will be necessary to take care of the expenses and make improvements and extensions. Dividends were not considered in the rates that have been requested.

### PRESIDENT EXPLAINS COMPANY'S NEEDS

On Feb. 21 Mr. Kurtz explained to members of Council, as a committee of the whole, why the increase is needed. It is estimated that the new changes will increase earnings about \$618,815 for the year. In the first place he pointed out that in addition to the loss sustained in 1918, amounting to \$440,000, the January statement showed a deficit of \$46,000. Within the next two or three years the company will be required to expend approximately \$1,034,000 for the improvement of Main, Fourth and Broad Streets, for back pay to the men and for the redemption of cash fare slips issued during the period when the railway company was collecting a straight 5-cent fare.

All of these things the company wants to do. In addition it wants to maintain its credit during the remaining seven years of its franchise. Furthermore, it wants to build extensions and make improvements on its present tracks and rolling stock, so that more efficient service may be given. A temporary increase in the rate of fare will not meet the requirements. The credit of the company rests upon the privilege which it has to operate in the streets of the city and upon the efficiency of its service.

### EARNINGS MUST PROVIDE FUNDS FOR IMPROVEMENTS

Mr. Kurtz feels that it will be impossible to make further bond issues at present for the purpose of obtaining funds for improvements and that any money which is expended must come from the earnings. He says that the equipment is worn and the property generally run down because of lack of funds to keep it in shape. It might be possible to strengthen, or even restore, the credit of the company through the adoption of reasonable rates of fare, so that money might be borrowed later, but this will not be possible if the Council grants the increases

and then makes the rates subject to modification or revocation at any time.

Expenditures for the present year should include \$697,422 for paving Broad, High, Fourth and Main Streets; \$143,146 for redemption of cash fare slips; \$81,590 for back pay to employees; \$62,000 for rebuilding ten open cars and expenses on other equipment; \$50,000 for placing general car equipment in good order, making \$1,034,158 which must be considered in connection with the yearly deficit of about \$440,000 under the old rate of fare.

### OTHER CITIES A CRITERION

Mr. Kurtz called attention to the rates of fare prevailing in other cities at this time, while his company is receiving the pre-war rate, lower perhaps than the rate in any other city in the country.

It is stated that the three members of Council who have consistently opposed everything in the way of an increase in rates in the past—Griffin, Alcott and Zimpfer—will continue to maintain that attitude in regard to the request of the new management. Other members of the body have not expressed themselves.

### So the Public May Know

The annual meeting of the stockholders of the New York & North Shore Traction Company, Roslyn, N. Y., was held on Feb. 18. The following directors were elected for the ensuing year: George A. Stanley, New York and Flushing; George F. Scofield, Cleveland, Ohio; Elmer G. Story, Bay-side; Charles S. Colden, Whitestone; John G. Moran, Flushing; Watson B. Robinson, New York City; Dr. Joseph H. Bogart, Roslyn; Jules P. Kunz, Flushing, and George P. Allen, Roslyn.

Messrs. Story and Colden will represent the Seven-Cent Fare League on the board. This is the league whose activities in favor of a 7-cent fare for the company have been reviewed recently in the ELECTRIC RAILWAY JOURNAL.

Mr. Story is the president of the league whose members are voluntarily paying a 7-cent fare on the company's lines within the limits of the city of New York. A few weeks ago Mr. Stanley, president of the company, said he would like to have the public represented on the board of directors in order that the people who use his company's cars might know how the road is conducted.

Dr. Bogart is president of the Bank of Hempstead Harbor and health officer of the town of North Hempstead. He is the citizens' representative on the board of directors of the company from Nassau County.

## More About Boston Zones

**Boston Elevated Trustees Will Proceed With New System Unless Legislators Intervene**

Unless the Massachusetts Legislature convince them of error, the trustees of the Boston Elevated Railway will put a zone system into effect in the near future. This was announced by Chairman James F. Jackson, who appeared with other members of the board at a legislative conference on the company's affairs on Feb. 21.

Two proposed inner zones are under consideration, one having a radius of about 2 miles and the other 3 miles from Boston City Hall. The former includes 20 per cent of the riding public and the latter about 50 per cent. The present intention of the trustees is to collect all fares in the inner zone on the pay-as-you-enter system, and passengers riding beyond the limits of the first zone will be obliged to pay their second fare when leaving the car. The pay-as-you-leave system will be applied to persons boarding cars in the second zone and leaving within that zone.

The trustees believe that with such a system a larger percentage of the fares will be collected than now obtains. Some of the present leakage, Mr. Jackson said, is due to conductors, and some to the traveling public. Without a zone system a flat fare of 9 cents is inevitable and a 10-cent fare is probable. Mr. Jackson said that even if the road should be relieved of subway and tunnel rentals, an 8-cent fare would be the lowest that would enable the company to break even in operating expenses.

### Final Chicago Fare Hearing

The question of whether the Chicago (Ill.) Surface Lines shall be permitted to charge a higher rate of fare now rests with the Public Utilities Commission of Illinois. Final evidence and arguments were introduced on Feb. 13 and 14, after which the case was taken under advisement.

A feature of the closing session was the formal notice from the company that the appeal in the United States Supreme Court attacking the jurisdiction of the commission over service matters would be dismissed. This is taken to mean that there will be further discussion of the order entered several years ago directing the Chicago Surface Lines to put on trail cars and other additional facilities.

Attorneys for the company pointed out the danger of bankruptcy and receivership if more revenue is not secured.

The city's lawyer made his principal fight on the valuation of the properties, claiming that a fair return on the actual investment would not call for an increase in the rate of fare.

Chicago is now in the midst of a fight over the mayoralty. As usual, the traction question and the fare situation are leading topics in the campaign speeches.



## Zones or Abandonment

In conference with the Common Council of Yonkers, N. Y., on Feb. 14, S. W. Huff, president of the Third Avenue Railroad System, declared that unless a zoning plan was adopted it would be practically impossible to increase fares on the Yonkers Railroad without abandoning a substantial amount of the lines in the outlying section of the city. The single fare, he contended, could not be increased enough to carry these lines without the danger of driving away passenger traffic altogether and thus making the situation worse than it is at the present time.

In a letter to the City Clerk of Yonkers, Mr. Huff said in part:

You will note from the report of your expert that even at the low valuation of the physical property as made by him, and without taking into account the numerous other items which must form a basis for the establishing of an equitable fare, he has found that the company is operated at a tremendous deficit and that this deficit is increasing at an alarming rate, notwithstanding that your expert finds that the property is being operated economically and efficiently and has no changes to suggest that might improve the situation, other than a modification of a contract for the operation of trackage outside of the city of Yonkers, which contract was approved by the Supreme Court and by both Public Service Commissions, after persons representing all the equities involved, including the city of Yonkers, had negotiated and agreed upon the contract.

You will further note from the report that the conclusion is reached that "some of the lines obviously could not be operated profitably on a 5-cent fare, nor even on a 10-cent fare."

This brings us to the real difficulty of the whole situation. With the spirit of optimism on the part of the city and on the part of the railroad company, there have been extensions of lines that should never have been made, and as the author of the report very properly says, they cannot be operated profitably on a fare even twice as much as that being now charged. The question which forces itself upon us all is this: Is it possible to tax the remaining lines with a fare sufficient to carry these unprofitable lines?

Our feeling is that it is probably not possible to place a sufficient single fare on the lines of the company as a whole to carry these outlying lines. To place the necessary fare on the lines as a whole would probably be to drive away travel to such an extent as to defeat the very purpose you and we would have in mind in making such increase. It would therefore seem to us that the only hope outside of a zone system which the city regarded unfavorably, lies in the abandonment of a substantial amount of outlying trackage and the determining of a fare which would be sufficient properly to support the remainder of the property.

## Cannot Lift Old Tickets

Attorney-General Atwill of Massachusetts has issued an opinion as to the duties of common carriers concerning books of reduced fare tickets and their use after an increase in fares is allowed. Under this finding the Attorney-General states that companies are forbidden by law to accept tickets sold previously to the increase in fares, but that each company is bound to redeem such tickets at their pro-rata value before the increase went into effect.

Many inquiries had been addressed to the Public Service Commission of Massachusetts on this point, notably from patrons of the Bay State Street Railway and Boston & Worcester Street Railway. It was contended by ticket-book buyers that when the fare was in-

creased, the old tickets should be accepted for the new fare until used. The companies refused so to honor superseded tickets. Instances were shown where speculators purchased from one to two dozen such books under the old rates of fare and held them until the increase went into effect with the purpose of selling them back to the companies at a price equal to the new fare scheduled.

## Experimental Fare Continued

The Public Utilities Commission of Rhode Island has authorized the Rhode Island Company, Providence, to continue in force the increased fares which it was authorized to charge as an experiment from Oct. 23 to March 1. The period of grace allowed extends to May 1. This action was taken to enable the receiver to get his bearings without having as an additional burden the difficulties attendant upon rate increase agitation.

The commission ordered the Rhode Island Company to establish commutation rates for regular patrons outside the 10-cent zone limits and also to prepare a schedule of excursion rates on heavily patronized lines. The company is ordered to submit these schedules to the commission by April 1. The excursion rate is to apply particularly to lines which are engaged in summer traffic.

Incidentally there is scheduled for a hearing on March 14 the case of the city of Cranston and the towns of Johnston, East Providence, Warwick and North Providence protesting against the increase in fares.

## Cincinnati Fare Going Up

Fares in Cincinnati will probably be increased to 6 cents on April 1, W. Kesley Schoepf, president of the Ohio Traction Company, predicted in his recent annual report to stockholders. The Ohio Traction Company owns and controls the Cincinnati Traction Company, which leases the Cincinnati Street Railway.

In speaking of the fare situation Mr. Schoepf said in part:

It is one feature of the Cincinnati franchise that allows increases of fares by half-cent stages. The increases did not begin to be made until the new arrangement had been tried out for three months at the old rate of 5 cents. The first increase was made on Jan. 1, 1919, to 5½ cents for tickets and 6 cents cash. It is anticipated that another increase will be made to 6 cents flat on April 1.

As to the wage situation the speaker said:

As to what will result in the next few months cannot be foretold. The War Labor Board's award is for the period of the war with the privilege of opening the question at the end of six months. It is believed that with adequate pay more satisfactory work can be gotten out of the employees. More honest, capable, industrious and courteous employees will be secured and retained if they are paid a good wage.

It is the hope of the management of the company that economies in operation and efficiency in all of its departments will make it possible to postpone any efforts to readjust wage scales, unless a natural readjustment and a general readjustment comes about, coincidental with the lowering cost of living, when readjustments would be made as a matter of course.

## Shore Line Reduces Fares

For the experimental period of six months from April 1 a new schedule of fares on the Shore Line Electric Railway system affecting the lines from New London, Conn., northerly to Willimantic, Conn., is to be put into effect. They show a reduction from the rates now in force.

The new schedule of fares was decided upon after a series of conferences between the officials of the railway, the selectmen and counsel of the towns of Norwich and Sprague and the members of the Public Utilities Commission.

A partial comparison of the old and new rates follows:

	New	Old
From Parade or any portion of city of New London to College.	5	5
To Best View .....	7.5	10
To Quaker Hill .....	10	10
To Alexander's .....	12.5	15
To Sanitarium .....	30	34
To Norwich .....	35	43
Franklin Square, Norwich, to Sanitarium .....	5	5
To Trading Cove .....	7.5	10
To Gallivan's .....	10	12
To Cook's .....	12.5	15
To Derry Hill .....	15	18
To Montville .....	17.5	20
To Dr. Fox's .....	20	23
To Alexander's .....	22.5	26
To Quaker Hill .....	25	29
To Best View .....	27.5	32
To College .....	30	35
To Parade, New London .....	35	43
To Ocean-Beach .....	43	48
From Franklin Square or other section of Norwich to St. Mary's Cemetery .....	5	5
To Baldwin's store, Taftville ...	7.5	10
To Taftville .....	10	10
To Lillibridge Road .....	17.5	19
To Baltic .....	20	22
To Willimantic .....	45	53
Franklin Square, Norwich, to sanitarium .....	5	5
To Averay's Lane, Bean Hill ..	7.5	10
To Yantic .....	10	10

In its memorandum accompanying the decision the commission said:

The present schedule of rates and method of collection present a very complicated system, more or less confusing for conductors and unintelligible to the traveling public. On the line from New London to Willimantic there are five different zone rates, namely, 5 cents, 4 cents, 3 cents, 2½ cents and 2 cents.

The proposed rates retain the present 5-cent zones in the cities of New London and Norwich, and establish uniform 2½-cent or one half nickel zones on suburban runs. The initial or minimum charge of 5 cents entitles the passenger to ride through two suburban zones, and for 7½ cents to ride through three such zones, etc. In traveling into or out of either city, the rider is entitled to travel through the city zone and the next outside zone for 7½ cents, with transfer privileges in the city.

In view of pending railway legislation and for any sufficient cause shown the commission reserves the right and jurisdiction over said matter, to annul, modify or amend this temporary order at any time. The rates hereby approved shall not be changed by the company without the approval of this commission. A detailed finding and final order will be issued by the commission within — days after the expiration of said six months unless otherwise previously disposed of by final order of the commission.

## Louisville Wants More

T. J. Minary, president of the Louisville (Ky.) Railway, called on Mayor Smith recently to acquaint him with the plight of the company. He made no formal request for an increase in fares, but later stated that a committee will call upon the Mayor and make such a request. No date has been fixed for the formal conference.



### One-Man Cars or Nothing

So strong was the opposition which developed against amending the existing ordinance so that the operation of one-man cars on the streets of Norfolk, Va., would be legal, and so conflicting the evidence adduced as to the efficiency of the one-man car, the Council on Feb. 11 decided not to pass on the matter until it was better understood.

A committee from the Council will confer with Admiral Coffman and officials of the United States Housing Bureau, which is financing the purchase of new cars for Norfolk, in which the one-man car will be discussed from all angles.

The attitude of the government officials who have charge of traction matters and the officials of the Virginia Railway & Power Company is that Norfolk must take the one-man car or nothing. That attitude was clearly expressed in the meeting of the Council when W. A. Mellin, of the housing bureau, stated that standard cars could have been ordered at the time the one-man car was ordered, but the traction and housing bureau officials considered that the one-man car was the better.

The chief objection, which has so far developed in the mind of the City Manager regarding this type of car, is the difficulty which will come in the enforcement of the Jim Crow law. It was shown the City Manager, that white passengers now always have to pass through a group of colored passengers on the standard car and that there would be little difference experienced in the colored passengers passing through groups of white passengers.

The City Manager has also suggested that an impartial committee be sent to a city where the one-man car is in operation to ascertain at first hand how the traffic is handled. This committee could report back to the Council and its report might have a large effect upon the decision of the Council.

### About \$48 Each for Being Careful

Two hundred and seventy-one platform men of the San Diego (Cal.) Electric Railway have recently received their "Safety First" checks. The sum of \$13,139 was distributed among the platform men, each man's check based on the number of hours of actual service during the year. The amount represents the savings from the 1918 accident fund.

Each year a certain per cent of the gross passenger earnings of the company is set aside as an accident fund. Out of this fund payments for personal injuries and damages are made and the amount left after this is done goes to platform men.

The total amount saved for the carmen this year exceeds that of last year, which amounted to \$12,225. The saving is considered all the more remarkable because of constant changes in the personnel necessitated by men leaving to go into government work or in the

service. Chairman Allen of the safety committee said:

This condition has improved materially with the return of former platform men from the service. The outlook during the coming year would be bright indeed from the standpoint of eliminating accidents if we could by some means receive a closer co-operation from drivers of automobiles on the city streets as well as from the men and women patrons in boarding and alighting from cars. Accidents in which automobiles are involved and those resulting from people jumping on or off moving cars regardless of warnings and pleas of car men to wait until cars stop, continue to be the greatest stumbling blocks to our efforts toward saving life and limb.

### Another Indiana Interurban Increase

The Public Service Commission of Indiana on Feb. 18 granted the Fort Wayne & Decatur Traction Company permission to increase its passenger fares from 2½ to 2¾ cents a mile. The increase was to become effective on Feb. 20, and to continue until Sept. 1, when the company is ordered to report its operating expenses and receipts to determine if the increase is to be made permanent.

### Richmond Comes Into Its Own

Mayor Ainslie of Richmond, Va., has approved the ordinance granting increased fares to the Virginia Railway & Power Company, and soon afterward the board of directors of the company passed a resolution accepting the conditions laid down by the city. Changes made by the ordinance are as follows:

Six-for-a-quarter tickets for the general public are abolished, and a straight 5-cent cash fare is substituted.

Labor tickets at 2½ cents each and good between the hours of 6 a. m. and 7 a. m. are abolished. Instead labor tickets will be sold at the rate of six for a quarter, and will be valid between the hours of 6 a. m. and 8 a. m.

School tickets and transfers remain as at present.

In November, 1917, the company filed with the City Council an application for increased rates. The application was referred to the committee on streets, and there were many public hearings, the opposition to increased rates being chiefly led by representatives of the Central Trades and Labor Council.

The two Council branches and the committee on streets played battledoor and shuttlecock with the matter but this finally came to an end in the City Council, when the Board of Aldermen passed the relief measure by a vote of ten to one.

The ordinance allows the company to maintain the increased rates for the period of one year, and at the end of that time the new law automatically comes to an end. The City Council, however, has the right to repeal the ordinance at any time that it may deem proper. One of its provisions, as accepted by the company, gives the city the right to examine the books, vouchers and methods of management of the company.

## Transportation News Notes

**Watchful Waiting.**—The hearings on the application to the Public Utilities Commission of Illinois of the East St. Louis (Ill.) Railway to charge a 7-cent fare have been completed and the company is waiting for the decision of the commission.

**Want Seven Cents in Boise.**—The Boise (Idaho) Railway, operating in the city, and the Boise Valley Traction Company, city and interurban, will ask the Utilities Commission of Idaho for permission to install one-man cars and to raise fares to 7 cents.

**Service Hearing Concluded.**—The hearing of the Trenton & Mercer County Traction Corporation, Trenton, N. J., before the Board of Public Utility Commissioners for failure to render proper service has been concluded. The matter has been taken under advisement.

**Ten Cents on Georgia Line.**—The petition of the Albany (Ga.) Transit Company for a 10-cent fare, ten tickets for \$1, has been allowed by the State Railroad Commission. The petition of the company was not opposed. In fact, the City Council of Albany sent a resolution asking that the increase be authorized.

**Governor Approves Fare Increase Measure.**—Acting Governor L. F. Hart of Washington on Feb. 17 approved a law passed by the Legislature, authorizing the Public Service Commission to exceed the 5-cent limit on railway fares within city limits and giving City Councils the same authority over municipally-owned lines.

**Wants Service Maintained Pending Inquiry.**—Employees of the Des Moines (Iowa) City Railway have petitioned the City Council to prevent any curtailment of service on the part of the Des Moines City Railway until such time as a complete survey of conditions can be made to determine whether or not such curtailment is necessary to meet the forced 5-cent fare.

**Wants Auto Line Restrained.**—The Aurora, Elgin & Chicago Railroad, Chicago, Ill., has filed a complaint with the Public Utilities Commission of Illinois charging that the Inter-City Motor Express Lines, operating over public highways and streets in and between Chicago and Elgin and Aurora, is conducting its business without having obtained a certificate of convenience and necessity from the commission.

**Public Authorities Divided.**—The City Commission of Millville, N. J., has decided not to oppose the application of the Millville Traction Company for an increase of fares between Millville and Vineland from 10 cents to 14 cents and a raise in fares in Millville from 5 cents



to 7 cents before the Board of Public Utility Commissioners on March 11, but the Borough Commission of Vineland, N. J., has instructed Solicitor Hurd to protest the advance.

**Lockport Granted Fare Increase.**—The Public Service Commission for the Second District of New York at its regular session on Feb. 20 passed an order permitting the International Railway to increase its rate of fare in Lockport to 6 cents, the order to become effective on March 1, 1919, for a period of one year and thereafter until the further order of the commission. It was pointed out that in 1918 the company sustained a deficit of \$9,978 and this was regarded as sufficient evidence to warrant the action taken by the State authorities.

**Suburban Fare Increase Suspended.**—The Public Service Commission for the Second District of New York has ordered suspended from Feb. 24 to and including April 30 rates of fare on Rochester lines of the New York State Railways under a complaint filed by Supervisor Louis J. Dubelbeiss, of the town of Irondequoit. The railway filed a tariff proposed as effective on Feb. 24 applying to one-way and round-trip cash and ticket fares on the Rochester and suburban lines to Irondequoit. Commissioner Barhite is investigating the proposed new fares.

**Very Successful Experiment in Publicity.**—One of the features of the recent ball by the employees of the United Railways & Electric Company, Baltimore, Md., was an extra edition of *Trolley Topics*, the company's semi-monthly paper. The copy for the paper was obtained at the ball and was rushed to the printer, who quickly ran off 3000 copies. These were hurried back to the hall and distributed by volunteer newsboys. The paper was a surprise to the guests, because it illustrated and told about things that were happening as those in attendance read about them.

**Elm Grove Company Wants Increase.**—The West Virginia Traction & Electric Company, Wheeling, W. Va., has petitioned the Public Service Commission of West Virginia for an increase in the fares on the City & Elm Grove Railroad. The present fare from Wheeling to Elm Grove is 10 cents, divided into one 6-cent zone and a 4-cent zone. The application is for a fare of 15 cents, the distance being divided into three 5-cent zones. One hearing on the matter has been held at Charleston, before the commission, and a second meeting will be held in the near future at Wheeling.

**Fare and Traffic Conference Called.**—The Public Service Commission of the State of Washington has called a conference for Feb. 28 at Tacoma, Wash., of city officials, representatives of commercial organizations and electric railways of the State, for the purpose of discussing fares and other traffic problems. Senate Bill No. 18, passed by the present Legislature and signed by the Acting Governor on Feb.

15, eliminates the 5-cent fare clause of the public service act of 1911. It is considered probable that the commission is preparing to establish uniform rates in all cities.

**Fare Case at Houston Appealed.**—The Houston (Tex.) Electric Company has appealed from the decision of the District Court of Harris County wherein it was held that the City Council of Houston was within its authority when it passed an ordinance repealing the 6-cent fare ordinance that it had previously enacted, the latter action being based on a referendum to the people in which a vote opposed to the 6-cent street-car fare was expressed. The case was taken before the First Court of Civil Appeals at Galveston and a motion by the company to advance on the docket was granted. The case is set for argument on March 6. An early decision is expected.

**Service Order Extended.**—The Public Service Commission for the Second District of New York has ordered that the time within which the New York State Railways was directed to restore service upon its lines in Rochester during the non-rush hours be extended until Feb. 17, at which time the company was to restore service as provided by the commission's order of Feb. 6. The company applied to the commission for an extension of time upon the ground that it had been impossible to prepare the necessary time-tables within the time stated in the original order and that according to an agreement in force between the company and its employees, the company is required to post the changes in service for a period of at least five days. The time within which the service was directed to be restored in the order was not sufficient to enable the company to comply with the terms of the order.

**Combination Bus and Railway Service Proposed.**—The City Council of Seattle, Wash., has requested Senator Daniel Landon to introduce in the Legislature a bill authorizing municipalities owning city railway systems to own and operate auto bus lines or jitneys, either in connection with the street railway or as supplementary to such service. Senator Landon states that the Council asked him to submit the bill, the city believing that it will be requested to operate jitney lines to connect with the city-owned railway system. The bill was drawn by Walter F. Meier, Corporation Counsel, at the request of the special legislative committee of the City Council. A member of the legislative committee states that the bill does not mean that the city contemplates a general jitney business, but that if the city takes over the railway system, it will do all in its power to provide adequate transportation for the public.

**Indiana Lake Shore Line Wants More.**—The Chicago, Lake Shore & South Bend Railway, Michigan City, Ind., has petitioned the Public Service Commission for permission to charge passenger fares on a basis of 3 cents

a mile for one-way travel between points on the line in Indiana. The company received permission from the commission last May to increase its basic charge from 2 to 2½ cents a mile. It obtained permission from the Interstate Commerce Commission last July to charge on the basis of 3 cents a mile for interstate traffic. A number of electric lines in Indiana have petitioned the commission for increases to 2½ cents a mile for passengers since the recently granted increase to 2½ cents from the regular fare of 2 cents. The Chicago, Lake Shore & South Bend Railway, however, is the first to ask for a 3-cent basis. The line is said to be operating under conditions more peculiar to steam lines than other electric lines in Indiana.

**Wants Sliding Fare in Jacksonville.**—Officials of the Jacksonville (Fla.) Traction Company are considering plans to secure an amendment to the company's franchise, at a special election, so as to permit an increase in fares. The proposed amendment would place into the hands of the City Council the power to decrease or increase the rate of fare from time to time, as conditions justify. In speaking of the plans a representative of the company is reported to have said: "We are simply putting the proposition up to the people themselves, whether or not the company is entitled to just consideration, and asking only for a fair deal which will prevent bankruptcy. We are operating at a financial loss, due to the greatly increased cost of material and labor. There must come relief that will justify a continuance of the service. The progressive people fully appreciate the reason we are seeking relief, and there can be no just objection to permitting the people to determine the question."

## New Publications

### McGraw Electric Railway List for February, 1919

273 pages. This list is published in February and August. By McGraw-Hill Company. Price \$7.50 a year.

Many important changes were made in this issue. They include: 1300 changes in the officials and chief operating men of the electric railway industry, 400 changes in power-plant equipment, 150 notes on substation equipment not published before, twenty notes on receiverships, dismantlements and suspensions, 300 changes relating to company connections and points reached and 700 population changes from latest state figures. The numerical indexes to companies and to individuals have also been rearranged. These changes were made from new reports received from 95 per cent of the 950 companies listed.



## Personal Mention

### Changes on Inland Empire Railroad

J. F. Gannaway has been appointed superintendent of the Spokane & Inland Empire Railroad with offices at Spokane, Wash. The appointment was made by F. E. Connors, the receiver of the railway. Mr. Gannaway was formerly assistant superintendent of the company.

F. S. Elliot has resigned as chief operating officer of the Spokane & Inland Empire Railroad, Spokane, Wash. This office has been abolished and the affairs of this position will hereafter be assumed by the receiver himself.

Waldo G. Paine, chief traffic officer, has become treasurer.

Elmo Edwards, formerly auditor, has assumed the duties of secretary of the company.

Mr. Paine and Mr. Edwards will have offices in Spokane.

Robert Crosbie, formerly secretary and assistant comptroller, and Paul McKay, treasurer and purchasing agent, with offices at Portland, have resigned.

The duties of purchasing agent for the railway have been taken over by the receiver.

W. R. Burns has been appointed auditor of the Dallas (Tex.) Railway to succeed L. W. Richards.

Charles F. Smith has been appointed auditor of the Sand Springs Railway, Tulsa, Okla., to succeed R. J. Guillan.

H. C. Lang has been appointed secretary and treasurer of the Western Ohio Railway, Lima, Ohio, to succeed R. B. Cook.

Lieut.-Col. L. V. Patch has been named a member of the Utilities Commission of Idaho, succeeding John W. Graham, resigned.

M. Cummings has been appointed auditor of the Springfield & Xenia Railway, Springfield, Ohio, to succeed J. F. Egolf.

William Reiser has been appointed treasurer of the Electric Bond & Share Company, New York, N. Y., to succeed A. E. Smith.

R. A. Hock has been appointed auditor of the United Gas & Electric Corporation, New York, N. Y., to succeed G. F. Bauer.

W. E. Eppler has been appointed comptroller of the United Traction Company, Albany, N. Y., to succeed W. H. Davies.

A. B. Eimer has been appointed auditor of the Niagara Gorge Railroad, Niagara Falls, N. Y., to succeed E. H. Buddenhagen.

Lee F. Swartout, who has been connected with the Michigan Railway, Jackson, Mich., and the predecessor

company since 1910, has been appointed clerk to the general manager.

G. A. Richardson, general superintendent of the Puget Sound Traction, Light & Power Company, Seattle, has been engaged by the Brooklyn (N. Y.) Rapid Transit Company to make an examination of properties and equipment of the Brooklyn Rapid Transit System and submit a report to that company.

Thomas Gibson, who has been master mechanic for the Reading Transit & Light Company, Reading, Pa., for the last three years, has resigned to accept a position as general manager of the Frankford, Tacony & Holmesberg Street Railway, Philadelphia, Pa. Mr. Gibson will assume the duties of the new position on March 1. His office will be at Tacony, Philadelphia.

Henry T. Ledbetter, formerly auditor of the Toledo Railways & Light Company, Toledo, Ohio, has been appointed secretary of the company to succeed A. C. Van Driesen, who, as noted in the *ELECTRIC RAILWAY JOURNAL* of Nov. 23, 1918, resigned to become assistant treasurer of all the properties of Henry L. Doherty & Company in Toledo, in active charge of all financial matters of the company.

L. K. Sherman, chief engineer of the Housing Corporation, has been appointed director of the Bureau of Industrial Housing and Transportation, United States Department of Labor, to succeed Otto M. Eidlitz, whose resignation is referred to elsewhere. Mr. Sherman is forty-nine years old, a native of Massachusetts, and was graduated from the Massachusetts Institute of Technology as a civil engineer in 1892. His experience for the last twenty-seven years has been as an engineer or executive on construction. His offices are in Chicago.

Otto M. Eidlitz has resigned as director of the housing bureau of the Department of Labor, L. K. Sherman, Eastham, Mass., who has been chief engineer of the bureau for some time, will succeed Mr. Eidlitz as director. Mr. Eidlitz is resigning to return to his building interests in Brooklyn, N. Y., which he laid aside at the outbreak of the war to manage the government's housing program. The housing bureau is one of the agencies which came into existence at the beginning of the war. How long it will remain in operation is uncertain.

George B. Dobbin has resigned as secretary of the Michigan Railway, Jackson, Mich., to become comptroller and chief accountant of the Northern Ohio Traction & Light Company at Akron, Ohio. He has been connected with the company at Jackson since 1912. As a mark of the existing friendship and in recognition of Mr. Dobbin's

favorite pastime; he was presented a handsome fisherman's outfit. A. J. Bray, now treasurer of the Michigan Railway, made the presentation speech. In addition Mr. Dobbin was given a testimonial, signed by his associates, attesting further the esteem in which he is held.

Harley L. Swift, formerly assistant superintendent of way and structures of the Mahoning & Shenango Railway & Light Company, Youngstown, Ohio, has been promoted from first lieutenant to captain and placed in command of Company C, Sixteenth Engineers (Railway). He has served continuously with this regiment since its arrival in France in August, 1917. During this period the company has constructed a large advance depot and yards; built standard and narrow-gage railway behind the British lines during March and April; constructed the Nevers cut-off and reclaimed Boche narrow and standard-gage railway during the Argonne and Meuse push, just previous to the end of the war.

A. J. Bray, at present auditor for the Michigan Railway, Jackson, Mich., has been appointed treasurer of the company to succeed J. W. Glendening, who has been made secretary. Mr. Bray entered business as a clerk in a bank at Elkhorn, Wis. After holding this position two years, he became chief clerk of construction work for the Bell Telephone Company in Wisconsin, acting as auditor of the estimates of that company. He was connected with the telephone concern for one and one-half years. In 1906 he became connected with the Michigan Railway. In January, 1911, he was made chief clerk and in August, 1912, he was promoted to auditor, which position he has filled until the present time.

Edward F. Seixas has been appointed general manager and official representative at Monterey, Nuevo Leon, Mexico, for the Monterey Railway, Light & Power Company, succeeding Lewis Lukes, heretofore vice-president and general manager, with offices at Toronto. Mr. Seixas has been general manager of the Niagara, St. Catharines & Toronto Railway since 1911. He was born in New York City in 1870. He entered business as a student with the General Electric Company, Schenectady, N. Y., and was connected successively with the World's Fair at Chicago, with the Amsterdam Railway, Light, Heat & Power Company, Amsterdam, N. Y., and then with the Niagara, St. Catharines & Toronto Railway.

Guy E. Tripp, assistant chief of ordnance, who resigned recently from the service to return to his duties as chairman of the board of the Westinghouse Electric & Manufacturing Company, on Feb. 13 was presented with a distinguished service medal by Secretary of War Baker. The presentation took place in the Secretary's office in the War Department. The citation as published in the army order follows: "Guy E. Tripp—As chief of the production division of the Ordnance De-



partment, and later as assistant chief of ordnance, he displayed fine technical ability and broad judgment in systematizing methods and practices, resulting in the efficient co-operation of industries producing articles of ordnance for the army."

**William A. Mellen**, formerly assistant manager of the transportation division of the United States Housing Corporation, has been appointed manager of the transportation division to succeed Major G. F. Wells, who recently resigned. Mr. Mellen was born at Fall River, Mass., on Jan. 14, 1880. He received his education there and was connected with the street railways of Fall River, where he worked under the direction of George W. Palmer. At the outbreak of the war Mr. Mellen was appointed supervising engineer in the United States Navy in charge of passenger transportation for the navy. He later resigned to accept the position as assistant manager of transportation of the United States Housing Corporation.

**J. W. Glendening**, who has been connected with the Michigan Railway, Jackson, Mich., since 1912, acting in the capacity of treasurer and assistant to John F. Collins, the general manager, will succeed G. B. Dobbin as secretary of the company and will also become secretary of the Saginaw & Bay City Railway. He is at present treasurer of this organization. Mr. Glendening came to Jackson in 1912 from Saginaw where he had been treasurer for four years, of the Saginaw & Bay City Railway and also treasurer of the gas and electric companies operating in Saginaw and Bay City. Previous to coming to Saginaw he was in the railway accounting department of the Public Service Corporation at Camden, N. J.

**Peter J. Abt**, special agent of the Detroit (Mich.) United Railway, has with four of his men been awarded the French "Croix de Guerre" for extraordinary services in capturing a nest of Germans, garbed as French soldiers, in the act of destroying a train of sustenance stores. Later he was given the "Distinguished Service Cross" by the American forces for the same act. Since President Wilson has been in France Captain Abt and the same four men have been on secret service guard attached to the President. On leaving for France Captain Abt was sent as a casual officer unassigned. Arriving "over there" Captain Abt was immediately placed in charge of a secret service detachment consisting of enlisted policemen and detectives from all parts of the United States.

**William L. Sause**, recently promoted by Mayor Craver of Youngstown, Ohio, from service director to be the city's first street railroad commissioner under the new service-at-cost plan of operation for the Mahoning & Shenango Railway & Light Company, was born in Youngstown thirty-six years ago. His first business connection was with the American Bridge Company. After

spending five years with this company in Youngstown Mr. Sause was sent to Toronto by the company. He remained there three years. Following this came four years with the General Electric Company when Mr. Sause had charge of part of the drafting and engineering department. While with this company he prepared for a wider future by taking a course in structural and bridge designing. Next came a position in the engineering department of the Brown Hoist Machinery Company. Three years after joining the Brown company, Mr. Sause returned to Youngstown on a visit to develop some property he owned in the East End of the city. A little more than a year ago the newly-elected Mayor made him service director.

**A. W. McLimont**, who in September, 1917, was appointed to succeed Wilford Phillips in charge of the active management of the Winnipeg (Man.) Electric Railway, has been elected vice-president of the company. He has also



A. W. McLIMONT

been made a director. Mr. McLimont is a Canadian by birth. He is very well known in electric railway and engineering circles in the United States. He has been connected at various times with the Michigan United Railways as vice-president and general manager, the San Francisco-Oakland Terminal Railways as vice-president and general manager, the Chicago & Milwaukee Electric Railroad as general manager. He entered public utility work in 1885 with the New England Telephone & Telegraph Company. Later he became connected with the Thomson-Houston Company, Boston, with which he served until 1903. After much work in organizing, installing and operating electric railway and electric light properties in the United States, Mr. McLimont entered the foreign department of the General Electric Company. His work abroad included service in Central America, Argentina, Mexico and at Lima, Peru. After his return to the United States from his work in foreign fields, Mr. McLimont became electrical and operating engineer of the Public Service Commission for the First District of New York.

## Obituary

**Minor Q. Woodward**, treasurer-manager of the Pine Bluff (Ark.) Company, is dead.

**Horace G. Allen**, for many years a member of the Boston (Mass.) Transit Commission, died at Boston on Feb. 12. He was sixty-three years of age. Mr. Allen was prominent in legal circles.

**Robert K. Black**, who assisted in the building of the first section of elevated railroad in New York City and who was for many years roadmaster of the Manhattan Elevated Railway, now included in the system of the Interborough Rapid Transit Company, New York, N. Y., died on Feb. 22 at his home in Scarsdale at the age of eighty-two years.

**Bruce W. Duer**, traffic expert for the Public Service Commission of Maryland, died on Feb. 15 of pneumonia. Mr. Duer was born at Princess Anne, Md., fifty-one years ago, and was educated at the Princess Anne Academy, entering railway service in 1884 with the New York, Philadelphia & Norfolk Railroad, serving consecutively as agent, operator, and dispatcher for several years, then going with the Baltimore & Ohio, working up to the position of superintendent of the Pittsburgh Division. He was vice-president of the Georgia & Florida Railway, with office in Augusta, Ga., for some time, before settling in Baltimore.

**Edie B. Wade**, captain of engineers, finance, accounts and contracts section of the American Expeditionary Forces, died of pneumonia at Coblenz, Germany, on Feb. 5. Captain Wade had been on the staff of Ford, Bacon & Davis, engineers, for a number of years. From September, 1914, to August, 1916, he was in their New Orleans office as engineering accountant on the construction of the cotton warehouses and terminal and grain elevator and also in the preparation of a report on the operation of the port, for the Board of Commissioners of the Port of New Orleans, and reports for various other clients including a report on the harbor of Mobile. In December, 1916, Captain Wade became attached to the New York office of Ford, Bacon & Davis and from there was sent to their San Francisco office, where he specialized on valuation work as engineering accountant. In May, 1918, he enlisted in the engineering corps at San Francisco, receiving a commission of captain. He was immediately sent to France with the American Expeditionary Forces, and has been doing important work at various points in France and England. At the time of his death he had just been sent to Germany. Captain Wade was well known in electric railway and professional engineering circles. He is survived by his widow and two children.



# Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER,

SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES

BUSINESS ANNOUNCEMENTS

## Railway Export Field Is Gradually Opening Up

Inquiries from Every Section of the Globe Show Increasing Attention Paid to System Maintenance

Although the export field for electric railway material is not normally active at the present time so far as actual orders reported for maintenance and new line material are concerned, according to the numerous inquiries which manufacturers and agents have received the outlook is very promising. Throughout the past few years the foreign field, the same as the domestic field, has shown great hesitancy in purchasing electric railway supplies, and many railway electrifications already planned have been held up pending a cessation of hostilities and a more favorable price market. Nevertheless, some small amounts of necessary maintenance material have already been shipped.

### EUROPEAN EQUIPMENT A FACTOR

A large field for railway equipment is open in South America. Some of the countries of that continent have much British and German stock invested in railways, and these two countries naturally have found an outlet for their own material which the United States may be able successfully to combat at the present time while Britain and Germany are returning to peace pursuits. This is true especially of railway motors which, it is reported, England is not now prepared to manufacture in large quantities; the necessary control for these motors however they are able to turn out.

The South American market is rather more active now than any of the others. To these southern republics there have been recent shipments of orders for rail welding and bonding equipment and pole line hardware and porcelain. Inquiries have been reported on many different materials, notably bare trolley wire, rail bonds and track specialties, such as switches, frogs, cross-overs, etc.

Canada also is rather active in the railway field. Negotiations are at present under way for a number of safety cars for Toronto, and practically all types of materials have found inquiries. Canada is the only country reported in the field for safety cars—South American countries have not yet come to the point where this class of service appears to be required. It is very noticeable that these southern countries demand little in the way of refinements in equipment, and the cheaper grades of materials consequently have found

a better market than higher priced goods. This lower grade of material has been pushed very strongly by the British and German manufacturers.

Porto Rico is a buyer of wire fence for rights-of-way, and the Dutch East Indies is in the market for track equipment.

The European market is beginning to show signs of activity. One of the largest fields for American manufacturers is that of electric rail welding and bonding, for there is reported only one European manufacturer of metallic electrode rail welders and that is a British firm. Much interest has been manifested recently in this equipment by Norway. Switzerland is in the market for copper-clad wire for railway transmission, telegraph, telephone and signal purposes, and for wire for manufacturing into fences for rights-of-way.

The confidence in the immediate field for electric railway equipment is further shown in the number of individuals who have recently been reported as seeking agencies for various kinds of equipment for foreign fields. The diversity of countries from which orders and inquiries are coming gives further evidence that railway development is not localized in any one continent but is in general world-wide.

## Increase in Maintenance Supplies Since 1914

Figures on One Road Show Virtually Same Volume of Goods Bought Per Car-Mile in 1918 as in 1914

A particularly interesting set of figures showing quantities and prices of typical maintenance material purchased in 1914 and 1918 by a road of 303 miles of track in 1918 and operating virtually the same car mileage in the two years, namely 8,836,333 car-miles in 1918 and 8,853,958 car-miles in 1914. The amount spent for this material in 1914 was \$161,774.44 and in 1918 was \$303,160.25. The increase in unit price in 1918 over 1914 was 105 per cent. This road, the Worcester (Mass.) Consolidated Street Railway, it will be seen from the figures, purchased in the two years about the same volume of material. With the car-miles virtually the same in each year it is interesting to note that in this case the volume of supplies purchased per car-mile was the same. The individual items, of course, showed different volumes of purchases but on the whole the quantity of goods was the same per car-mile in each of the years for which figures are shown.

TYPICAL MATERIAL QUANTITIES AND PRICES

Material	Per Cent Increased Price	1914		1918	
		Quantity	Unit Price	Quantity	Unit Price
Axles.....	135	36	\$11.73	72	\$27.58
Field coils.....	127	624	21.09	752	47.80
Armature coils.....	105	480 sets	33.36	1,200 sets	68.23
Steel wheels.....	111	132	18.25	252	38.50
Chilled wheels.....	108	1,248	7.48	1,155	15.53
Controller segments.....	138	4,457	.064	1,520	.152
Trolley wheels, 4 1/2 in.....	159	2,532	.58	5,040	1.50
Trolley wheels, 5 1/2 in.....	108	996	.93	960	1.93
Shoe heads.....	144	1,140	2.25	795	5.50
Truck castings.....	94	113	3.09	250	6.00
Steel castings.....	119	67 lbs.	.09	395 lb.	.197
Malleable iron castings.....	74	1,904 lbs.	.0575	3,025 lbs.	.10
Commutator segments.....	117	36 sets	21.56	96 sets	46.85
Malleable-iron armature bearings.....	87	312	.70	296	1.31
Malleable-iron axle bearings.....	46	264	1.07	769	1.56
Trolley wire No. 00.....	92	253,667 lbs.	0.1495	16,658 lbs.	.2868
Copper bonds.....	82	1,632	.82	1,036	1.49
Steel pinions.....	132	636	3.52	900	8.15
Steel gears.....	113	192	10.45	348	22.30
Trolley wire No. 0000.....	96	69,690 lbs.	1701	13,872 lbs.	.3335
Canvas.....	158	1,944 yds.	71	1,367 yds.	1.83
Babbitt metal.....	236	15,672 lbs.	.33	8,650 lbs.	1.11
Brakeshoes.....	24	15,852	.54	19,525	.67
Cold-rolled steel.....	100	4,917 lbs.	.05	4,100 lbs.	.10
Norway iron.....	181	17,939	.0267	5,900 lbs.	.075
Glass.....	103	2,168 lbs.	.335	2,200 lbs.	.681
Trolley bases.....	90	20	12.60	58	24.00
Signal switches.....	30	20	20.00	30	26.00
Mechanical ears 4/0.....	161	1,914	.115	420	.30
Plain ears 4/0.....	100	1,104	.31	2,460	.62
Plain ears 2/0.....	146	3,588	.2156	4,320	.53
Trolley harps.....	67	444	.60	640	1.00
Friction tape.....	89	5,028 lbs.	.19	5,535 lbs.	.36
Trolley rope.....	134	1,956 lbs.	.32	2,853 lbs.	.75
Ties.....	30	64,614	.46	50,441	.60
Brake cable.....	249	3,896 ft.	.0459	7,024 ft.	.16
Overhead frogs.....	263	120	1.15	121	4.18
Journal bearings.....	81	768	1.36	1,380	2.46
Tie rods.....	179	1,419	.164	1,260	.457
Controller fingers.....	33	3,224	.30	3,520	.40
Axle collars.....	93	73	2.59	164	5.00
Brush holders.....	38	267	2.55	344	3.53
Gear cases (malleable).....	139	84	15.92	372	38.00
Car paint.....	18	324 lbs.	.22	1,475 lbs.	.26
Rubber-covered wire.....	105	49,045 ft.	.0402	110,500 ft.	.0826
Trolley poles.....	116	228	1.25	385	2.70
Brass axle bearings.....	74	120	7.25	417	12.65



## Rolling Stock

Rutland Railway Light & Power Company, Rutland, Vt., will during the year equip two one-man cars.

Goldsboro (N. C.) Electric Railway expects to purchase this year two single-truck closed cars.

Tidewater Power Company, Wilmington, N. C., expects to purchase this year equipments for two suburban cars.

Savannah (Ga.) Electric Company reports that it expects during the current year to purchase twenty one-man cars.

Kensington (Md.) Railway reports that it will purchase this year one double-truck passenger car if costs drop to the old base.

Kansas City, Lawrence & Topeka Railroad, Kansas City, Kan., during this spring will change one single truck car to one-man pay-as-you-enter type.

Winona Interurban Railway, Warsaw, Ind., will purchase this year ten 40-ft. freight trail cars. All city car equipment is to be changed over for one-man operation.

Capital Traction Company, Washington, D. C., has received and is now operating the twenty new cars ordered last summer, specifications of which appeared in these columns on April 20, 1918.

Southwestern Gas & Electric Company, Texarkana, Ark., has received ten new cars of the latest improved pattern, to replace those destroyed in the fire that recently burned the company's

carhouse, as noted in these columns on Feb. 1.

Washington Railway & Electric Company, Washington, D. C., lost part of its Eckington carhouse and twelve cars in a recent fire. Most of the burned cars were of the old hand-brake type, but several were of the large type operating the Maryland and Rockville lines. The trucks of the latter, however, were saved. The company has put in operation twenty-one of the fifty new cars ordered last summer, specifications of which were given in the issue of this paper for May 4, 1918. Several more car bodies and trucks have been received and are in storage awaiting delivery of motors, some of which have now been shipped.

## Trade Notes

Chicago (Ill.) Pneumatic Tool Company has moved its Cleveland district office from Room 813 to Rooms 406-408 Engineers Building. Ross Watson is district manager.

Independent Pneumatic Tool Company announces that after March 1, the Eastern branch of the company will be located at 1463 Broadway, at Forty-second Street, New York City. This change, the company states, has become necessary owing to its increased business in the East.

American Car & Foundry Company, St. Charles, Mo., has moved into its new machine and pattern shop, recently completed by the Dickie Construction Company of St. Louis. The building is

a fireproof structure, costing approximately \$150,000, and covers 240 ft. x 95 ft. of floor space.

James N. Hatch, consulting engineer, Chicago, has formed an association with Henry C. Eckland, to act as architects and engineers under the firm name of Henry C. Eckland & Company. Mr. Hatch will also continue his consulting practice of public utility and industrial engineering as heretofore.

Carl P. Dennett, Major, U. S. A., treasurer of the Griffin Wheel Company at Boston, has returned to this country and is resting up in the South. He was chosen by Henry P. Davison of the American Red Cross as its representative in complete charge of the welfare of American prisoners in Germany.

The Wagner Electric Manufacturing Company, St. Louis, Mo., has made arrangements to distribute 3000 shares of stock to officers, department executives, and their immediate principal assistants, at par, according to an announcement by President W. A. Layman. The stock is now quoted in the market at \$125 a share.

Major Ainslie A. Gray has retired from the Ordnance Department and under the firm name of A. A. Gray & Company has opened offices at 1547 Marquette Building, Chicago, Ill., where he will assist manufacturers in solving their problems of production, advertising and selling and distribution. Before the war Major Gray was a member of the firm of Gray & Benjamin of Chicago, and prior to the establishment of that firm was editor of the *Electrical Review*.

## NEW YORK METAL MARKET PRICES

	Feb. 13	Feb. 27
Copper, ingots, cents per lb.	17.50	15.25
Copper wire base, cents per lb.	20.75	18.75 to 19.00
Lead, cents per lb.	5.00	5.25
Nickel, cents per lb.	40	40.00
Spelter, cents per lb.	6.80	6.65
Tin, cents per lb.	172.50	172.50
Aluminum, 98 to 99 per cent., cents per lb.	31.50	31.50

† Government price in 25-ton lots or more f. o. b. plant.

## OLD METAL PRICES—NEW YORK

	Feb. 13	Feb. 27
Heavy copper, cents per lb.	14.50 to 15.00	13.00 to 13.50
Light copper, cents per lb.	11.50 to 12.00	11.00 to 11.25
Heavy brass, cents per lb.	8.00 to 8.25	7.50 to 7.75
Zinc, cents per lb.	5.25 to 5.50	5.25 to 5.50
Yellow brass, cents per lb.	6.50 to 6.75	6.00 to 6.50
Lead, heavy, cents per lb.	4.75 to 4.25	4.75 to 4.87
Steel car axles, Chicago, per net ton.	\$28.00 to \$30.00	\$28.00 to \$30.00
Old carwheels, Chicago, per gross ton.	\$22.00 to \$23.00	\$22.00 to \$23.00
Steel rails (scrap), Chicago, per gross ton.	\$16.50 to \$17.50	\$15.50 to \$16.50
Steel rails (relaying), Chicago, gross ton.	\$50.00 to \$55.00	\$15.50 to \$16.50
Machine shop turnings, Chicago, net ton	\$6.00 to \$6.50	\$5.50 to \$6.00

## ELECTRIC RAILWAY MATERIAL PRICES

	Feb. 13	Feb. 27
Rubber-covered wire base, New York, cents per lb.	25	23
Weatherproof wire (100 lb. lots), cents per lb., New York	31.25 to 33.75	28.75 to 33.75
Weatherproof wire (100 lb. lots), cents per lb., Chicago	30.75 to 35.75	30.75 to 37.35
T rails (A. S. C. E. standard), per gross ton	\$60.00 to \$65.00	\$60.00 to \$65.00
T rails (A. S. C. E. standard), 100 to 500 ton lots, per gross ton	\$57.00 to \$60.00	\$57.00 to \$60.00
T rails (A. S. C. E. standard), 500 ton lots, per gross ton	\$55.00 to \$60.00	\$55.00 to \$60.00
T rail, high (Shanghai), cents per lb.	31	31
Rails, girder (grooved), cents per lb.	41	41
Wire nails, Pittsburgh, cents per lb.	31	31
Railroad spikes, drive, Pittsburgh base, cents per lb.	3.90	3.90
Railroad spikes, screw, Pittsburgh base, cents per lb.	8	8
Tie plates (flat type), cents per lb.	3	3
Tie plates (brace type), cents per lb.	3	3
Tie rods, Pittsburgh base, cents per lb.	7	7
Fish plates, cents per lb.	3	3
Angle plates, cents per lb.	3	3
Angle bars, cents per lb.	3	3
Rail bolts and nuts, Pittsburgh base, cents per lb.	4.90	4.90
Steel bars, Pittsburgh, cents per lb.	2.70	2.70
Sheet iron, black (24 gage), Pittsburgh, cents per lb.	4.55	4.55
Sheet iron, galvanized (24 gage), Pittsburgh, cents per lb.	5.60	5.60
Galvanized barbed wire, Pittsburgh, cents per lb.	4.35	4.35

	Feb. 13	Feb. 27
Galvanized wire, ordinary, Pittsburgh, cents per lb.	3.95	3.95
Car window glass (single strength), first three brackets, A quality, New York, discount †	77%	77%
Car window glass (single strength, first three brackets, B quality), New York, discount	77%	77%
Car window glass (double strength, all sizes AA quality), New York discount.	79%	79%
Waste, wool (according to grade), cents per lb.	13 to 20	13 to 20
Waste cotton (100 lb. bale) cents per lb.	11 to 13	11 to 13
Asphalt, hot (150 tons minimum) per ton delivered.		
Asphalt, cold (150 tons minimum, pkgs. weighed in, F. O. B. plant, Maurer, N. J.), per ton.	\$43.00	
Asphalt filler, per ton.	\$45.00	\$30.00
Cement (carload lots), New York, per bbl.	\$3.20	\$3.20
Cement (carload lots), Chicago, per bbl.	\$3.34	\$3.34
Cement (carload lots), Seattle, per bbl.	\$3.68	\$3.68
Linseed oil (raw, 5 bbl. lots), New York, per gal.	\$1.48	\$1.48
Linseed oil (boiled, 5 bbl. lots), New York, per gal.	\$1.55	\$1.55
White lead (100 lb. keg), New York, cents per lb.	13	13
Turpentine (bbl. lots), New York, cents per gal.	71½ to 72	70 to 71

† These prices are f. o. b. works, with boxing charges extra.



## Franchises

**Buffalo, N. Y.**—The Frontier Electric Railway Company, owned by the International Railway, is seeking by the provisions of a bill introduced in the State Legislature at Albany, an extension of two years within which to begin construction of its proposed line between Buffalo and Niagara Falls. The company also seeks a two years' extension of life of its franchise.

## Track and Roadway

**Oakland, Antioch & Eastern Railway, Oakland, Cal.**—As a result of the negotiations for the reorganization of the Oakland, Antioch & Eastern Railway, the Oakland & Antioch Railway and the San Ramon Valley Railway, which have extended over a number of years, a new corporation to be known as the San Francisco, Oakland & Sacramento Railway is to be formed to take over the properties of the reorganized companies, announcement to this effect having been made. The reorganization plan presented to holders of the securities of the three companies for their approval a year ago was declared to be fully operative, 85 per cent of the holders of the various classes of securities issued by the companies having given their assent to the plan.

**Waterbury & Milldale Tramway, Waterbury, Conn.**—The Waterbury & Milldale Tramway plans to extend its line to connect with the line of the Connecticut Company at Dickerman Corners, Milldale Township.

**East St. Louis Suburban Railway, East St. Louis, Ill.**—The East St. Louis & Suburban Railway Company will install about 7 miles of new double track due to city street improvement plans. The rail will be a 7-in. 91-lb. T-rail laid on both concrete and ballast foundation. It is expected that the work will commence about May 1.

**Charleston, Mo.**—It is reported that the construction of a line from Charleston to the Mississippi River opposite Hickman, Ky., is under consideration by local capitalists. The Charleston Commercial Club may be able to give information.

**New York Municipal Railway, Brooklyn, N. Y.**—The Committee on Transit of the Board of Estimate recently approved the Ashland place connection between the Fulton Street elevated line and the Fourth Avenue subway in Brooklyn. The connection calls for the construction of an incline from the Fulton Street line under Fulton Street from Cumberland Street to Ashland Place.

**Buffalo & Depew Railway, Buffalo, N. Y.**—The Public Service Commission for the Second District of New York recently passed an order approving the construction by the Buffalo & Depew Railway of a single track extension, sidings, etc., of the company's line from Burlington Avenue and Ellicott Road in

the town and village of Lancaster, easterly in Ellicott Road to Central Avenue and along Central Avenue in Lancaster Village to 50 ft. north of the New York Central Railroad.

**Niagara Junction Railway, Niagara Falls, N. Y.**—Plans are being made by the Chamber of Commerce of Niagara Falls to have the Niagara Junction Railway extend its electric line so as to skirt the city and make a belt line loop of the city's industrial section. The Niagara Junction Railway operates considerable trackage for its electric locomotives along Buffalo Avenue and it is planned to extend the line so as to tap the lower milling district. The city would be asked to allow the company to operate its locomotives over certain tracks of the International Railway so as to connect with certain proposed tracks. The road is electrified and the Chamber of Commerce believes the proposed extension would meet with practically no opposition.

**London (Ont.) Street Railway.**—The London Street Railway is contemplating the reconstruction of some of its lines in London.

**Morristown, Tenn.**—Plans have been prepared for the construction of an electric railway from Morristown to Pressmen's Home, about 30 miles, and an extension to Kyle Ford, making a total length of about 50 miles. John N. Adams, Nashville, chief engineer.

**Dallas, Tex.**—The organization of an electric railway company for the purpose of building a line through the Mount Auburn and Park View additions to the city of Dallas has been undertaken. This action was decided on when the Dallas Railway Company declined to grant the petition of property owners of these additions for a street car line. The proposed company will be capitalized at \$150,000 and will build and operate a line about 1½ miles long to connect with the Dallas Railway Company's line near Fair Park. The proposition is being promoted by Henry G. Wills, and one-half the capital stock has been subscribed. Application will be made at once to the Secretary of State for a charter, after which the line will be built.

**Northern Texas Traction Company, Fort Worth, Tex.**—It is reported that the Northern Texas Traction Company plans to construct an extension to the Santa Fe station.

**Waco, Tex.**—D. T. Shaw of Hillsboro, is taking steps to promote a company for the purpose of building an electric interurban line from Waco through Hillsboro and Cleburne to Fort Worth. The Tarrant County Traction Company operates a line from Fort Worth to Cleburne. Mr. Shaw plans to purchase this line and extend it to Waco.

**Monongahela Valley Traction Company, Clarksburg, W. Va.**—The Monongahela Valley Traction Company contemplates the extension of its line from Wolf Summit to West Union or Shirley.

## Power Houses, Shops and Buildings

**Shore Line Electric Railway, Norwich, Conn.**—Work is under way by the Shore Line Electric Railway on the construction of a substation at West View. The power house at Mystic will be discontinued, the new building obtaining power from Greenville.

**Potomac Electric Power Company, Washington, D. C.**—Plans have been completed and contracts are now being awarded by the Potomac Electric Power Company, controlled by the Washington Railway & Electric Company, for a second extension of the turbine room at its Bennings plant, consisting of the installation of one 20,000-kw. G.E. turbo-generator and Worthington surface condenser. The company recently completed an extension of its turbine and boiler rooms, the work consisting of the installation of one 15,000-kw. Westinghouse turbo-generator, Worthington surface condenser and six 1000-hp. Babcock & Wilcox boilers with Taylor stokers, together with coal and ash handling equipment, boiler feed pumps, heaters, etc.

**Hamilton Utilities Company, Benton, Ill.**—A new substation, outdoor type, equipped with three 100-kva. transformers, is being erected by the Hamilton Utilities Company, operated by the Central Illinois Public Service Company of Mattoon.

**Illinois Central Electric Railway, Canton, Ill.**—Plans have been made by the Illinois Central Electric Railway for the construction of an office building, including freight house and waiting room, at Canton.

**Water, Light & Transit Company, Carrollton, Mo.**—The installation of a water filtering system and other improvements to its properties is contemplated by the Water, Light & Transit Company.

**Kansas City, Mo.**—The firm of Wight & Wight, architects, Kansas City, has been employed by the Interurban Central Station Company to design the proposed interurban passenger terminal at Tenth and McGee Streets. Contracts for the project will probably be let in the early summer.

**St. Joseph Railway, Light, Heat & Power Company, St. Joseph, Mo.**—This company has installed an additional feed pump and coal crusher at its power house. A new boiler will also be installed.

**New York Municipal Railway Corporation, Brooklyn, N. Y.**—Bids will be received by Lindley M. Garrison, receiver of the New York Municipal Railway Corporation, until March 4 for the installation of electrically driven, automatically controlled seepage and emergency pumps, etc., in the pump rooms of the Sixtieth Street and Montague Street tunnels. Plans and further information may be obtained at the Municipal Railway's offices at Room 412, 85 Clinton Street, Brooklyn.



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San Antonio's famous 200-year-old structure, the Alamo, and San Antonio's Peacock Brakes both endure for just one reason. Both were **built honestly**—and time, in the one case, and service, in the other, play no havoc with them. Maintenance costs are almost unknown in connection with San Antonio's Peacocks (the name of any other city using these brakes might be substituted here for San Antonio, with equal truth). Peacocks keep the cars making revenue miles in any kind of weather, under any traffic conditions. And such miles are of vital importance **now**, when revenue means so much. For old cars or new, one man or two-man service—**lowest in first cost and final figures.**

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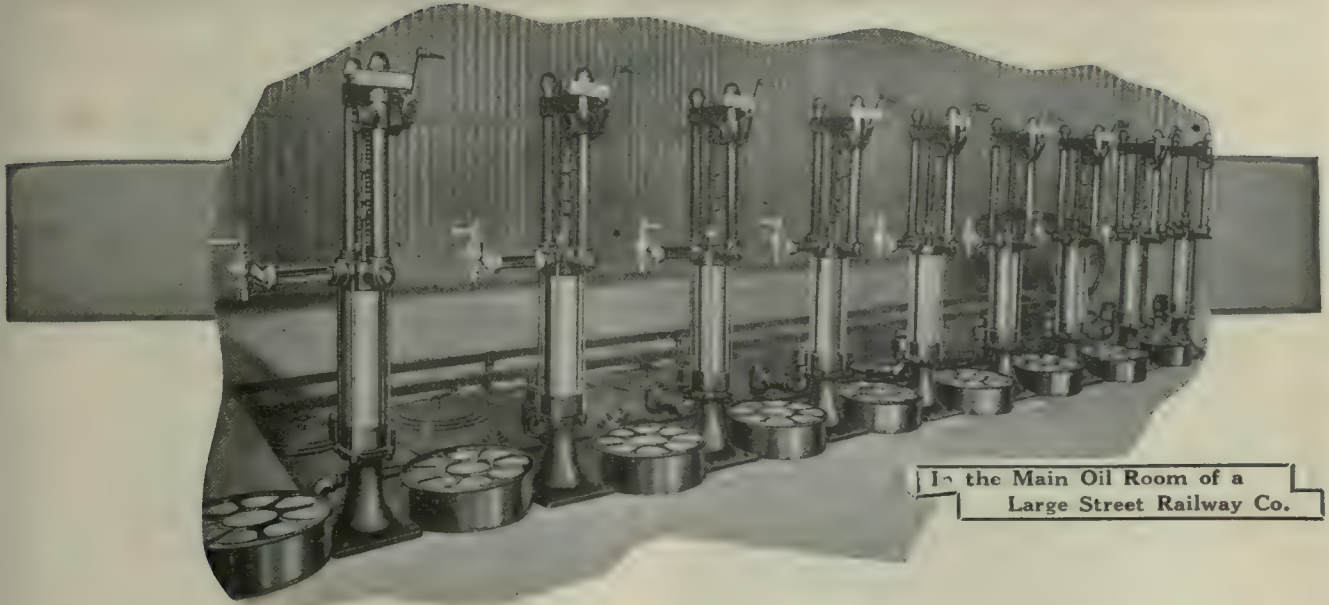
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Inspectors and telephone booths, flag-man stations, waiting rooms, etc.

Send us your plans for any one-story building purpose. Be sure to enclose *complete* measurements and description re window location, door sizes, etc. We will *standardize* your plans numbering them for repeat orders, applying intelligently the Prudential System to meet your requirements. *Begin with us today—*we give you what you want.

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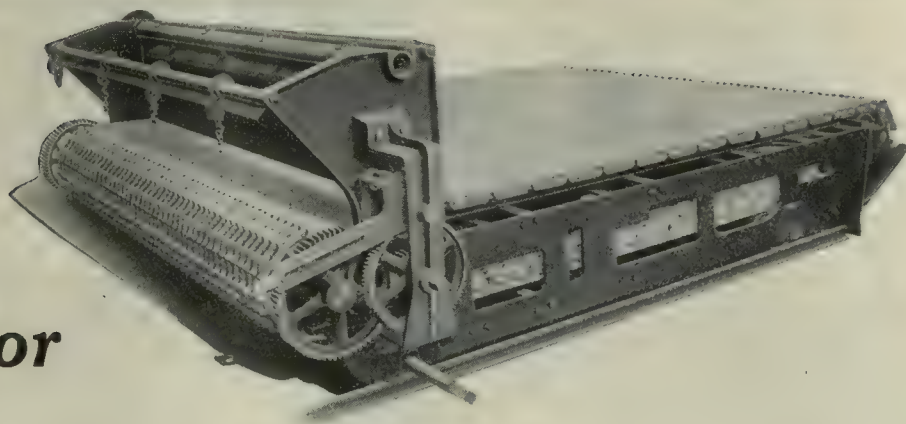


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Six years have elapsed since Green Chain Grates supplanted the stokers formerly used in this plant. During that time records covering the minutest items of operating expense have been carefully kept, says W. E. Ralston, Superintendent of Motive Power. The remarkable results achieved by Green Chain Grates are best expressed in a letter from Mr. Ralston, when he says:

"In connection with the operation of the Green Chain Grate Stokers I am pleased to advise that their operation has been very satisfactory. Two of the stokers have been in continuous operation for a period of six years and four for a period of something over three years. During this time a careful check was made on the cost of upkeep. "Our average percentage of cost and maintenance based on the original cost

of installation is 6.4%, of which 2.2% applies to the maintenance of all metal moving parts of the stokers, and 4.2% includes arch, tile, brick-work, cement, etc. for maintaining the furnace.

"Since the installation of these stokers we have been able to maintain continuously 24 hours a day, a boiler rating of 180% and are able to take care of peak loads up to 220% boiler rating."

And this record is not exceptional—it is but typical.

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## Annual Maintenance Number *of Electric Railway Journal*

Dated March 22, 1919

**A**S usual, this looked-for issue will be the trusted guide of those in charge of maintenance work for power plants, substations, bridges and structures, track and roadway, overhead systems and rolling stock.

The text pages will outline maintenance methods for all departments.

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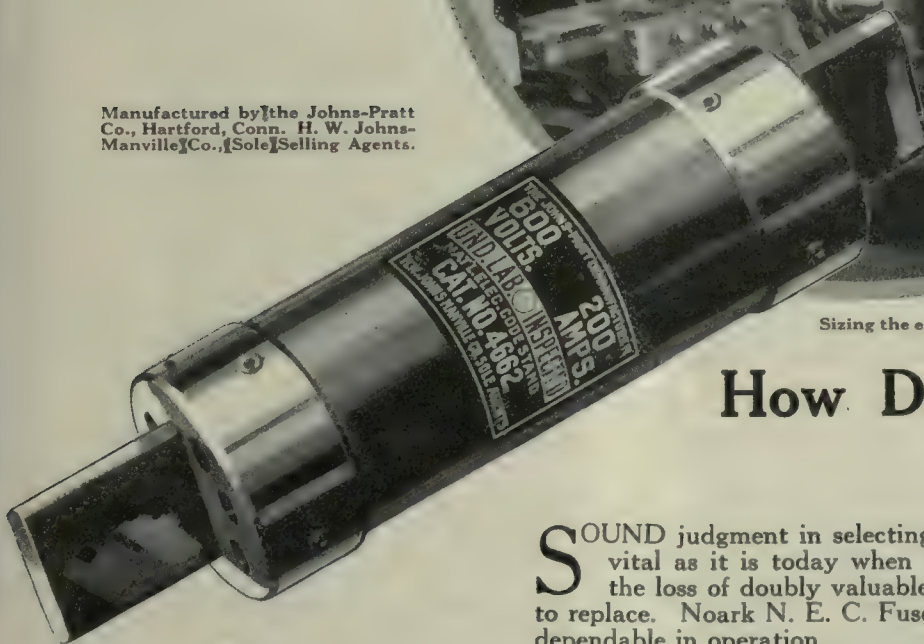


# NOARK<sup>N.E.C.S.</sup>FUSES

Manufactured by the Johns-Pratt Co., Hartford, Conn. H. W. Johns-Manville Co., Sole Selling Agents.



Sizing the ends of fuse tubes.



## How Do You Judge a Fuse?

**S**OUND judgment in selecting the right fuse was never before so vital as it is today when "the fuse that didn't blow" means the loss of doubly valuable time, labor and apparatus difficult to replace. Noark N. E. C. Fuses are right in design and absolutely dependable in operation.

Their reliability is the result of years of fuse-building experience—which goes into every fuse turned out.

Precise calibration and high-grade workmanship, backed by constant testing and checking throughout the process of manufacture, combine to produce a fuse in which you can put your trust.

A "Noark" is always safe.

H. W. JOHNS-MANVILLE CO.  
New York City  
10 Factories—Branches in 63 Large Cities



And also through—

## Asbestos

and its allied products

JOHNS-MANVILLE  
Serves in  
Conservation

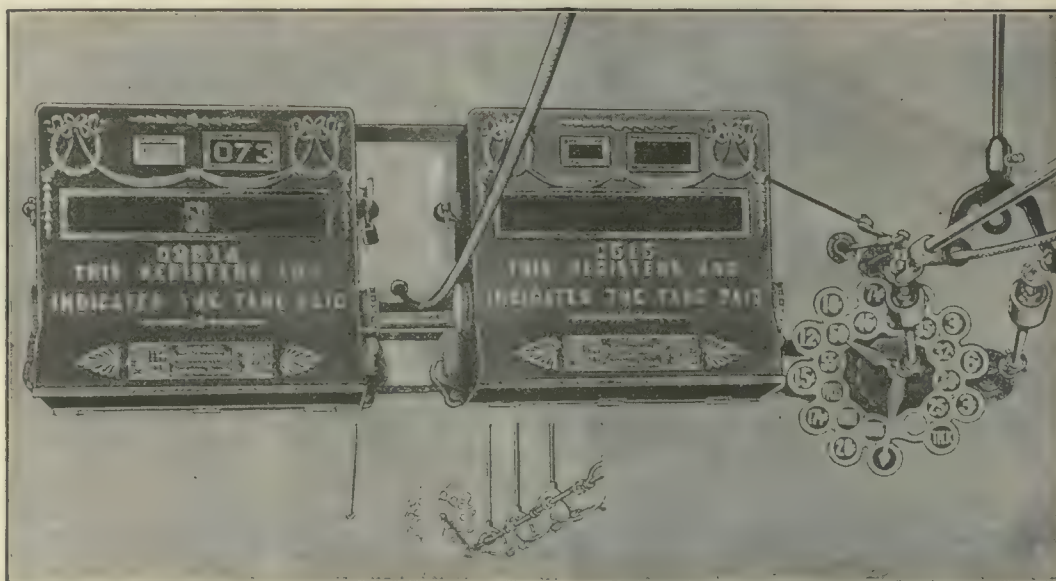
Heat Insulations, High  
Temperature Cements,  
Asbestos Roofings,  
Packings, Brake  
Lining, Fire  
Prevention  
Products

# JOHNS-MANVILLE





# The OHMER Twin Register Combination



**T**HE flexibility of the Ohmer System of fare accounting is well demonstrated by the Ohmer Twin Register Combination which is finding special favor just now among the interurbans.

The combination consists of two Ohmer Fare Registers installed on a special double operating device. Each fare is clearly indicated and a full printed report of the business done in each car is produced even though the number of denominations is more than double the normal capacity of one register. The result is accomplished by using each register singly to its full capacity and then combining the registrations of the two machines in such a way as to greatly increase the number of fare denominations which can be handled.

The illustration shows two No. 4 Ohmer Fare Registers in the combination. Registers of this type may be mounted so that it is possible to record fares from 5 cents to \$5.95 in steps of 5 cents or 1 cent to \$1.19 in steps of 1 cent.

When No. 14 Type Ohmer Registers are used, the capacity of the combination is 5 cents to \$6.95 in steps of 5 cents, or 1 cent to \$1.39 in penny multiples.

A reasonable number of non-cash denominations, such as ticket, pass, etc., can be handled without reducing the number of cash denominations. Let us give you more information about the "Twins."

Have you a fare collection problem of any kind which worries you? Let us have full particulars. Out of our experience we can help you. You will be under no obligation.

## OHMER FARE REGISTER CO.

Dayton, Ohio



# Making Transportation Worth More

— to those who sit



— to those who stand



with

## Hale and Kilburn Seats

If you expect to get more revenue for your transportation, you have to give *better service* to two classes of riders — those who secure seats and those who must stand.

Hale and Kilburn Seats make transportation worth more — in ease and comfort to those who secure seats, because —

They need not be spaced too closely for good knee-room, and the shaping of cushion and back permit a comfortable posture.

The end fixtures and pedestals are not wasteful in space. Two passengers can share a cross seat in harmony with plenty of seat room.

The passenger is as comfortable at the end of a long ride as he — or she — is when the ride begins.

For those who must stand — (and your profits in transportation lie among the "standees") the offset end parts increase width of aisle — and the Hale and Kilburn Corner Grip handle is an evidence of thought for them. It prevents

accidents caused by clumsy loops on seat backs, because passengers do not have to twist or distort their hands to take hold — that means prevention of broken fingers or wrists due to sudden lurches.

There's a Hale and Kilburn Seat for every kind of service — all based on nearly half a century of experience in producing the right seat for any given requirement.



## Hale and Kilburn Corp.

Philadelphia  
Washington  
Detroit

New York  
Atlanta  
Chicago

San Francisco  
Louisville  
St. Louis







## Sell Transportation by the Mile

This is the only equitable basis. The Bonham Traffic Recorder will automatically compute and record both the mileage and fare. It will at the same time indicate and record where the passenger boarded the car and the destination. Such a record of traffic makes discussions with railway commissions simple and convincing; for you have all the facts.

With such information before you, your road is operated with full knowledge of sources or revenue as well as those of loss. No guesswork! These are poor times to guess.

*Adopt the*

**BONHAM TRAFFIC RECORDER**  
*and KNOW*

*Ask for our new bulletin.*

**The Bonham Recorder Company, Hamilton, Ohio**



# Simplify Your Fare Collection

Ticket Side  
Type C17  
Coin and Metal  
Ticket Fare Box



Type R10  
Single Register



The constant changing of fare rates make the problem of fare collection one of great importance. Increased fare is one means of increasing revenue—and the absolute collection and registration of every fare is another means.

International Fare Boxes and Coin Registers offer the most effective means of simplifying the problems of fare collection due to changing fare rates. With the "International" method of fare collection the conductor is able to collect fares with a minimum of effort or confusion and with maximum speed, for International Equipment handles any fare whether it be single unit coin, off cents or either in combination with the metal token, and also conspicuously registers it. Hence the counting room is assured of an accurate rendering of every collected fare.

Take advantage of our years of experience in the development of fare collection devices.

*Submit your fare collection problems to us. Our suggestion for improvements will be of service to you.*




Type C14 Coin and  
Metal Ticket Register




Type C17 Coin and  
Metal Ticket Fare Box

**The International  
Register Company**  
15 South Throop St., Chicago, Ill.





# Thousands of Columbia Trolley Poles Ready for Immediate Shipment



For 1½-inch and 2-inch Base Harps  
and for lengths of 11-feet to 15-feet.



Columbia-Made Trolley Poles are Made Right

Below are some Columbia-made specialties conveniently listed

## Columbia Machine Works & Malleable Iron Co.

Atlantic Ave. and Chestnut St.

Brooklyn, N. Y.

W. R. Kerschner Co., Inc., N. Y.  
Holden & White, Inc., Chicago  
F. F. Bodler, San Francisco  
Railway & Power Eng. Corp.,  
Ltd., Toronto, Ont.

### TOOLS

Armature and Axle Straighteners  
Armature shaft straighteners  
Armature buggies and stands  
Babbitting molds  
Banding and heading machines  
Car hoists  
Car replacers  
Coil taping machines for armature leads  
Coil winding machines  
Pinion pullers  
Pit jacks  
Signal or target switches  
Tension stands



### CAR EQUIPMENT

Armature and axle bearings  
Armature and field coils  
Bearings (axle and armature)  
Brush-holders and brush-holder  
springs  
Brake, door and other handles  
Brake forgings, riggings, etc.  
Car trimmings  
Commutators  
Controller handles  
Forgings of all kinds  
Gear cases (steel or malleable iron)  
Grid resistors  
Third-rail shoe beams and accessories  
Trolley poles (steel) and wheels





## Look through the record of good service in car materials



The record made by the *actual service* of the materials at work—and you will find ample evidence that **PANTASOTE** Curtains and **AGASOTE** Roofing—Headlining—Wainscoting have proven to be big factors in developing “better service at lower cost.”

### THE PANTASOTE COMPANY





# BOYERIZED *Products*

**Are  
good enough  
to go a long way  
at Calgary,  
Alberta**

Boyerized Bushings are standard although it's miles from Springfield, Massachusetts, to Calgary, Alberta.

But wise and careful operators will go a long way to get the best.

The Calgary Municipal Railway does because it appreciates the value of a bushing that is consistently and uniformly long-lived.

Why have someone putter around with tubing in your own short-handed shops when we can give you a perfect product when and as you want it?

ELECTRIC RAILWAY SUPPLIES

**Bemis Car Truck Company**

SPRINGFIELD MASS

Bemis Trucks  
Case Hardened Brake Pins  
Case Hardened Bushings  
Case Hardened Nuts and Bolts

Manganese Brake Heads  
Manganese Transom Plates  
Manganese Body Bushings  
Bronze Axle Bearings



# Standard for 69 Years

## The Wonderful Single Service Chilled Iron Wheel

### The Chilled Iron Wheel has performed its every function at a minimum cost

#### **For Freight Cars**

95 PER CENT of all cars in this type of service are equipped with Chilled Iron Wheels, provided for by the MASTER CAR BUILDERS' STANDARDS, as follows:

- 625 lb. Wheel for Cars of 30 tons capacity
- 700 lb. Wheel for Cars of 40 tons capacity
- 725 lb. Wheel for Cars of 50 tons capacity
- 850 lb. Wheel for Cars of 70 tons capacity

#### **For Street Cars**

The Chilled Iron Wheel is Standard for Street Car Service in 95 PER CENT of all cities in the United States and Canada, operating 100 cars or over.

#### **The Reason**

Chilled Iron Wheels possess a graded hardness of structure, which is ideal for service,

namely: HARD TREAD, SOFT PLATES AND SOFT HUB; Chilled Iron will not CRUSH OR FLOW under heavy loads.

A demonstration of the BEARING POWER OF CHILLED IRON is found where heavy hoisting cranes are operated, each wheel carrying 105,000 pounds.

Chilled Iron Wheels under cars of 70 tons capacity are only required to carry 25,000 pounds each.

#### **The Conclusion**

The uninterrupted use of Chilled Iron Wheels for 69 years under 95 PER CENT. of the nation's equipment proves that no other material can match them for economical and dependable service.

**25,000,000 Chilled Iron Wheels in Service**

**ASSOCIATION OF MFRS. OF CHILLED CAR WHEELS**  
1229 McCormick Bldg., Chicago

*Representing forty-eight wheel foundries throughout the United States and Canada. Capacity 20,000 Chilled Iron Wheels per day*





TRADE MARK  
REG. U. S. PATENT OFFICE.

## The Standard for Rubber Insulation

Power Cables—Signal Wires—Car Wires  
Motor Leads, etc., etc.

Steel Armored—Lead Covered—Braided

*We Manufacture*

Okonite (Rubber) Insulated Wires and Cables  
Varnished Cambric Insulated Wires and Cables

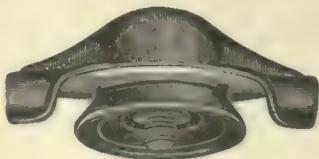
Okonite Tape—(Rubber Insulating)  
Manson Tape—(Rubber Filled Cloth)

*Samples and Estimates on Application*

**THE OKONITE COMPANY, 501 Fifth Ave., cor. 42nd St., New York**

CENTRAL ELECTRIC CO., Chicago, Ill., General Western Agents

F. D. Lawrence Electric Co., Cincinnati, O. Novelty Electric Co., Philadelphia, Pa. Pettingell-Andrews Co., Boston, Mass.



## You Can Minimize Overhead Repair Work

and successfully cut maintenance costs if you turn to

## The Macallen Line

of strain insulators, hangers, splicing ears, crossings, and other overhead material.

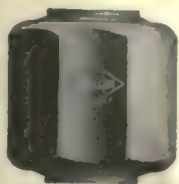
They are "specialty" products, designed and built to make "Macallen" the standard on American railways.

It will pay you to write for information and prices.

## The Macallen Insulating Joint

Adopted by principal air brake manufacturers as part of their standard equipment. Also insulates steam pipes, etc. Shell is seamless drawn steel, nipples are machined from steel rod, and insulating material is Macallen Vulcanite Compound, not affected by heat or oil—practically indestructible.

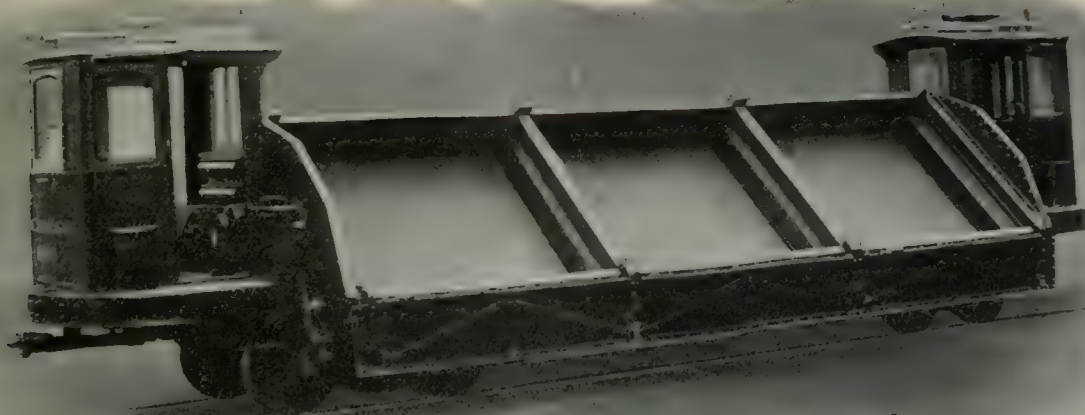
May We Send Our Catalog?



**The Macallen Company**  
Macallen and Foundry Sts., Boston







**M**ODERN  
METHODS OF  
MAINTENANCE  
MEAN  
MONEY  
MADE

**D**IFFERENTIAL  
DUMP CARS  
DO IT

DIFFERENTIAL CAR CO., Inc., 141 Broadway, New York

## SAFE SIGNALS for SAFE ROADS

No road is safe if its signal system is uncertain, unaggressive or unsubstantial.

U. S. Electric Signals are big, aggressive notices of safety or danger. A blind man could hardly disregard them. Strongly made and weather immune. Protect both front and rear of cars. Type G, illustrated here, is a simple, safe and effective signal at a low price. More than a thousand sets in daily use.

Don't wait for the accident! Write for particulars today.



United States Electric Signal Company

West Newton, Massachusetts

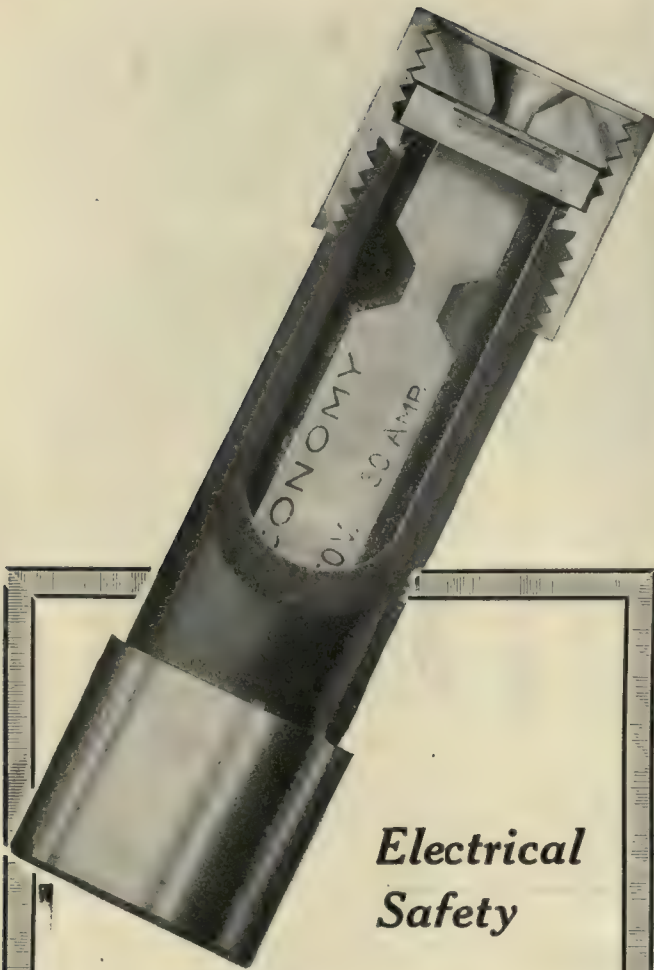
Representatives:

Western: Frank F. Bodler, Monadnock Bldg., San Francisco

Foreign: Forest City Electric Service Supply Company, Salford, Eng.







## Electrical Safety

Thousands of large users of electricity, among which are many of our leading electric railways, millions of circuits with

# ECONOMY renewable FUSES

ECONOMY FUSES are accurately rated. That means safety. They can be used over and over. That means Economy. It takes but a moment to replace the link and renew the fuse. That means convenience.

An inexpensive "Drop Out" Renewal Link restores a blown Economy Fuse to its original efficiency.

The ECONOMY is a pioneer renewable fuse—the first to be proved practical. It is widely imitated, but not duplicated.

Order by brand, from your electrical jobber or dealer.

Write for Catalog 17

## ECONOMY FUSE & MANUFACTURING CO.

Kinzie and Orleans Sts.  
CHICAGO, U. S. A.

Sole Manufacturers of "ARKLESS"—the  
Non-Renewable Fuse with the 100%  
Guaranteed Indicator

ECONOMY FUSES ARE ALSO MADE IN  
CANADA AT MONTREAL



A Tribloc Hand Chain Hoist in the stock room hustles heavy pieces in and out with a speed that saves time all over the shop—turns 80% work into 100% efficiency and doesn't balk at a rush or overload.

For a Ford Tribloc is safe, no matter how fast it is operated. Its exclusive feature, the Loop Hand Chain Guide keeps the chain on the wheel and prevents "gagging."

It will handle loads greater than its rated capacity without danger of slip or break—the all-steel planetary gears are responsible for that.

Tribloc performance means much to us—that's why our five-year guarantee means much to you.

## Ford Chain Block & Mfg. Co.

Second and Diamond Streets, Philadelphia, Pa.

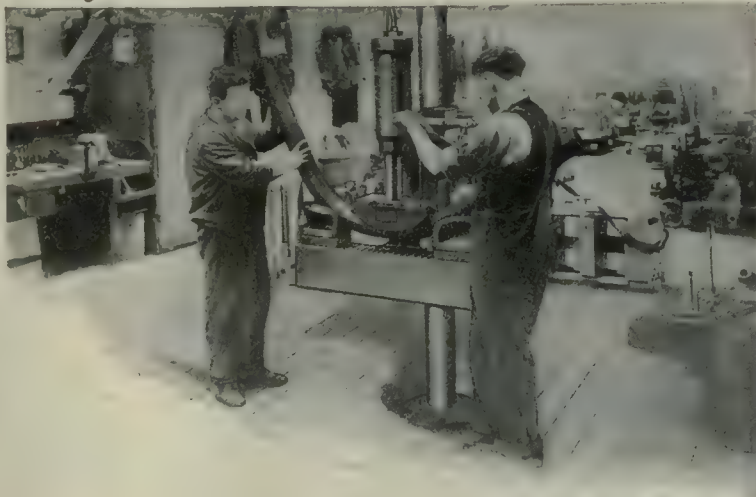
OVER-SEAS REPRESENTATIVE  
ALMACO ALLIED MACHINERY COMPANY OF AMERICA  
120 BROADWAY, NEW YORK, U.S.A.



## This Hydraulic Bender Will Bend Your Conduit Pipe, Straighten Trolley Poles, Etc., Rapidly and Accurately

It is built in standard sizes of thirty to forty tons capacity, sufficient to bend one-inch to six-inch pipe.

The base is ribbed so that the lower bending block may be placed wherever desired. One set of blocks is needed for each size of pipe, the change from one size to another being readily made.



30-Ton Hydraulic Bender  
Bending 4 in. Pipe

We build many sizes of hydraulic benders. All as carefully designed as the above to give the user the best service. Wherever car frames, rails, pipe, shafting, etc., is bent, one of our many benders can invariably be profitably used.

Our line of over 4000 complete machines, including jacks, punches, shears, accumulators, pumps, presses, valves, fittings, packings, etc., is illustrated and described in catalog form, free for the asking.

*Write for Catalogs*

### The Watson-Stillman Co.

Engineers and Builders of Hydraulic Machinery  
46 Church Street, New York  
Chicago—McCormick Bldg.



259

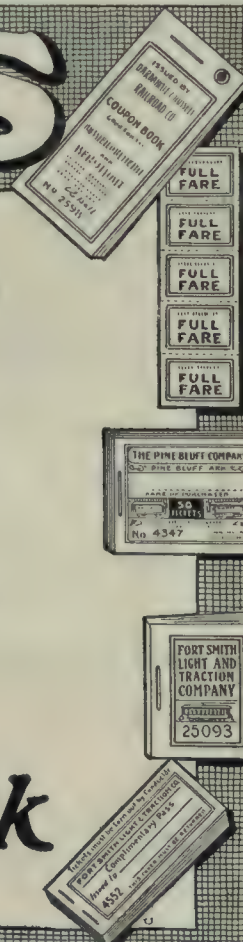
# TICKETS

Accuracy, Quality and Service describe best our product.

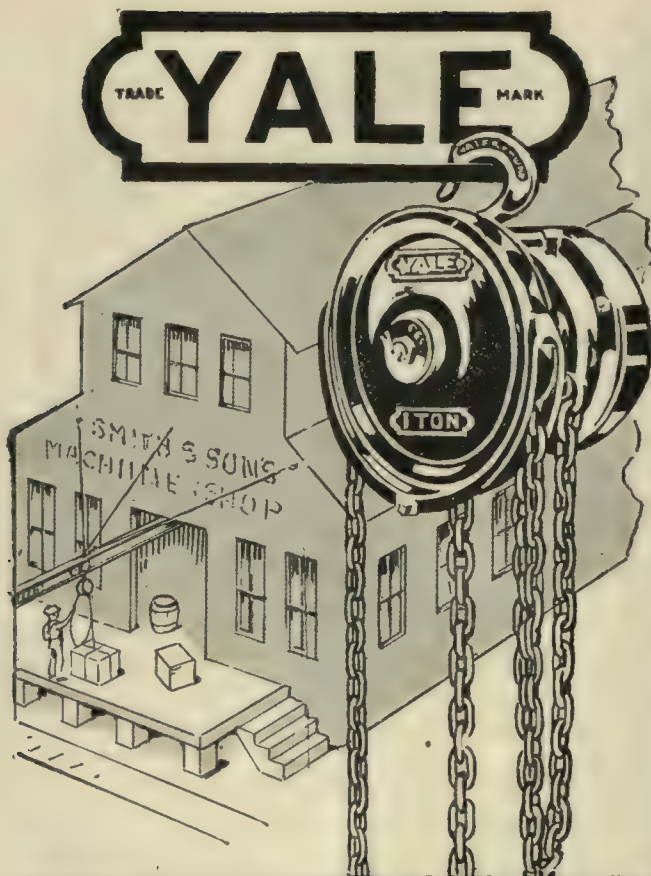
We make no "talking point" of price, although, as a matter of fact, our tickets usually cost you less than you can buy them elsewhere.

*In asking for quotations always send sample and state quantity desired.*

**Weldon-Williams & Lick**  
FORT SMITH, ARK.







## The YALE Spur-Gear Chain Block

*easily and quickly* hoists MOTORS, CAR BODIES and REPAIR PARTS.

And the *special* steel construction of its vital parts supporting the load—means SAFETY to the user.

Made especially for all Terminal hoisting—no matter how difficult.

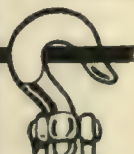
### 'From-Hook-to-Hook-a-Line-of-Steel'

Catalog 18D tells ALL—or ask your Machinery Supply House.

*For a Factory Locking Equipment use a Yale Master-key System.*

*Write for Particulars*

**The Yale & Towne Mfg. Co.**  
9 East 40th Street New York City



## BOUND-BROOK

GRAPHITE AND BRONZE. TRADE MARK REG. U. S. PAT. OFF.

### Trolley Wheel Bushings

The less attention your trolley wheel bushings require, and the longer they last, the lower go your maintenance costs.

Plain bushings are costly at the best, for they present a problem in lubrication which demands constant watching—an excessive expenditure of time and labor.

Bound Brook (Oil-less) Trolley Wheel Bushings eliminate much of this care and expense—for they are always adequately lubricated, *whether attended to or not.*

Whatever slight difference there may be in the initial cost is more than offset by their long wearing qualities and economy of maintenance.

For Bound Brook Bushings last far longer, under every condition of service, than any other bushing of whatever type.

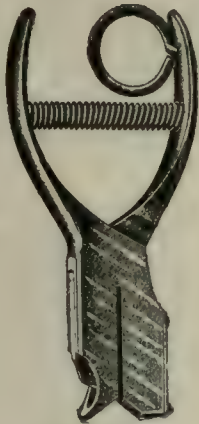
*All Genuine Graphited Oil-less Bushings have always been made at Bound Brook, U. S. A.*

**Bound Brook Oil-less Bearing Co.**  
Bound Brook New Jersey

Detroit Office: 1723 Ford Bldg.

*"Specialists in the manufacture of Oil-less Bushings for more than a third of a century"*





Cuts 1 1/2 in. from the edge.

The Dies for  
**B-V Punches**  
*Are Made of Tool Steel*

That is why they are superior.  
The B-V quality never fluctuates. It's staunch  
and true in every punch of our 100 varieties.

*Orders can be promptly filled  
owing to our augmented facilities*

**BONNEY-VEHSLAGE TOOL CO.**  
61 New Jersey R. R. Ave.  
Newark, N. J.

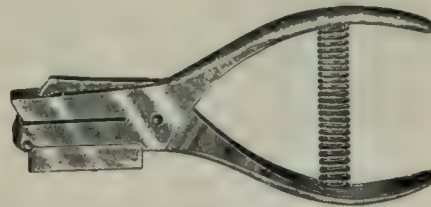


Cuts 7/8 in. from the edge.



Cuts 1 in. from the edge.

ONE HAT
WYOMING
SLEDALE
HAMILTON
MOULTON
GARFIELD
HARRISBURG
DAYTON
COLUMBUS



Cuts 1 in. from the edge.



## Reliable Gears

Maximum strength and minimum weight are essential qualifications  
of gears. Gears made from

## Carnegie Rolled Steel Gear Blanks

have those qualifications—are reliable—because they are lighter and  
will wear three to seven times as long as cast steel gears.

They are gears pre-eminently adapted to conditions where long  
service is sought under high speed operations, where shock, jar  
vibrations and wide and sudden load variations will be encountered  
—service destructive to even the best gears.

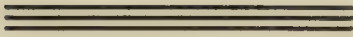
Service use has determined their superiority and dependability.

Quotations and literature can be had from any Carnegie office.

### Carnegie Steel Company

464 Frick Building Annex, Pittsburgh, Pa.





## In LINDALL Brush Holders



- brushes are easily inspected and renewed.
- the brushes need not be recessed.
- constant brush pressure is provided.
- there are no screws or nuts to work loose.

## Lindall Brush Holders

They have been in service for several years on some of the biggest systems of the country—with attendant reduction in brush holder maintenance expense.

**Albert & J.M. Anderson Mfg. Co.**

*Established 1877*

**289-293 A St., Boston, Mass.**

### BRANCHES:

New York, 135 Broadway  
Chicago, 105 So. Dearborn Street  
Philadelphia, 429 Real Estate Trust Bldg.  
London, E. C., 48 Milton Street

## Here's the HENSLEY Story

**Better Melting** of metal—an up-to-the-minute oil burning furnace with great capacity enables us to get absolute uniformity in all heats—a better wheel is the result.

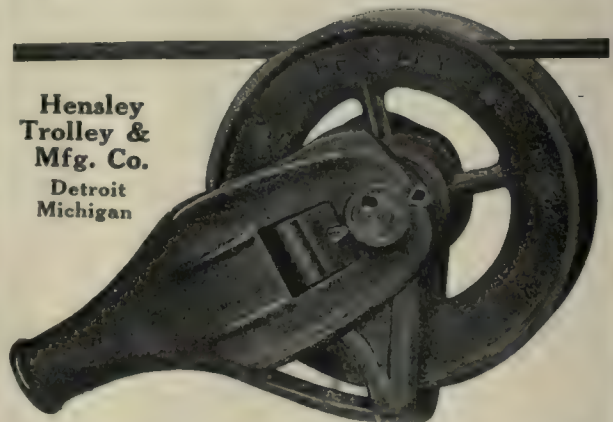
**Faster Moulding**—a new automatic moulding equipment—which gives accurate, uniform castings, eliminates delays and inaccuracies incident in the human element in moulding.

**More Accurate Machinery**—an up-to-date machine process has been installed, which enables us to finish trolley wheels quickly, cheaply and accurately.

**All Wheels Carefully Tested**—All wheels are carefully tested for defects before being packed.

**Delivery and Shipping Facilities** are equally as "speedy" as our other advanced facilities. All of which is backed up by our 15 years' experience in Brass and Bronze foundry work and trolley wheel manufacture.

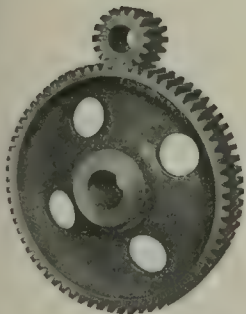
**Hensley  
Trolley &  
Mfg. Co.**  
Detroit  
Michigan







## Prepare for Next Summer TO HAUL MORE FREIGHT



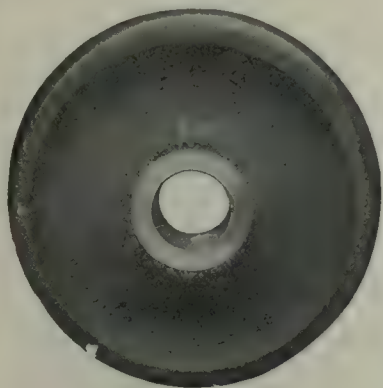
**O**FTEN railways have rolling stock that could be pressed into freight or train service where only a change in gear ratio is required. This applies to freight motor cars that now are running, perhaps, at the same speed or nearly that of passenger cars—which with a change in gear ratio could handle three or more trailers at night or after hours.

**Nuttall BP treated gears meet the requirements of Freight Service.**

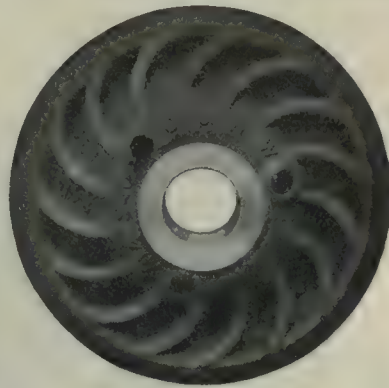
**R. D. Nuttall Co., Pittsburgh, Pa.**

# Nuttall Gears

EVERY GEAR REGISTERED



## The Cost of GRIFFIN F. C. S. WHEELS



is of secondary consideration when taking into account their guarantee and scrap value.

Every detail of manufacture is given the most careful attention. They are scientifically designed so that each part is correctly adapted for its particular function.

The chilled tread surface contains three and one-half per cent carbon white iron—is harder than tool steel, and capable of long wear.

Griffin service will assist you in selecting the proper size and weight for your cars.

## GRIFFIN WHEEL COMPANY

McCormick Building, Chicago, Ill.

FOUNDRIES:

Chicago

Detroit

Boston

Los Angeles

Denver

St. Paul

Tacoma

Kansas City



# "STANDARD"

Steel Tires                      Steel Tired Wheels  
                                         Solid Rolled Steel Wheels  
                                         O. H. Steel and Malleable Iron Castings  
                                         Solid Forged Gear Blanks  
 Steel Forgings                      Iron Forgings  
                                         Forged and Rolled Steel  
                                         Pipe Flanges  
 Ring Dies                      Rings                      Roll Shells  
                                         Steel Springs



*"The 'Standard' Brand on your material  
 is an assurance of eventual economy."*



## STANDARD STEEL WORKS CO.

GENERAL OFFICES:

MORRIS BUILDING, PHILADELPHIA, PA.

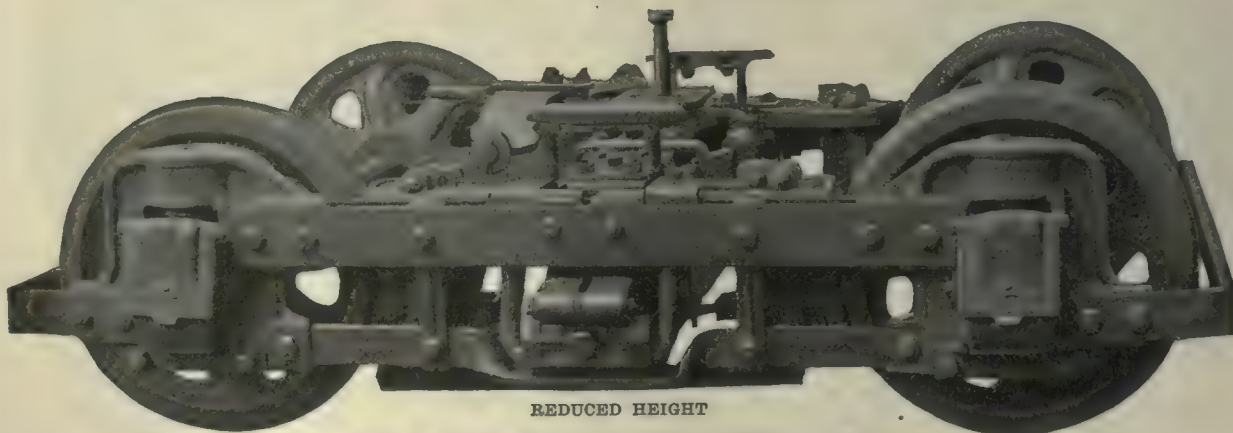
CHICAGO  
 ST. LOUIS  
 HAVANA, CUBA

RICHMOND  
 SAN FRANCISCO  
 NEW YORK  
 MONTEREY, MEX.

MEXICO CITY  
 LONDON, ENGLAND  
 PARIS, FRANCE

R. H.

## TAYLOR REDUCED HEIGHT TRUCK



REDUCED HEIGHT

### TAYLOR R. H. TRUCK

Mounted on 26-in. Wheels with Springs Over Journal Boxes.

Designed to Mount Centre and End Entrance Cars Low Down

SWING MOTION AND FULL ELLIPTIC SPRINGS

Wheel Base 5 ft. 2 in. For Car  
 Bodies weighing 16,000 to 22,000 lb.  
 Motors Inside Hung.

**EASY  
 RIDING**

Journals  $3\frac{3}{4}$  x 7 M. C. B. Type.  
 Height from Rail to Body Bolster,  
 22 $\frac{3}{4}$  in. Brakes Inside Hung.

**TAYLOR ELECTRIC TRUCK CO., TROY, N. Y.**

SPECIFICATIONS ON REQUEST

Established 1892

SEND FOR PORTFOLIO



# KERITE



## BE GUIDED

by facts, not theories —  
by performance records, not claims —  
by experience, not prophecy. Every  
consideration points straight to KERITE  
for permanently satisfactory and economical service.

## KERITE INSULATED WIRE & CABLE COMPANY

General Offices, 30 Church Street, New York Western Office, Peoples Gas Building, Chicago

Lith. Bridge 30 145

## Steel Poles For Every Pole Purpose

Cut shows Bates Steel Poles in Electric Trolley Line Service by Des Moines City Ry. Co., Des Moines, Iowa. Over 2100 Bates Poles in use in Des Moines, mostly Trolley Service and some Street and Park lighting.

Bates Steel Poles are becoming universally popular.

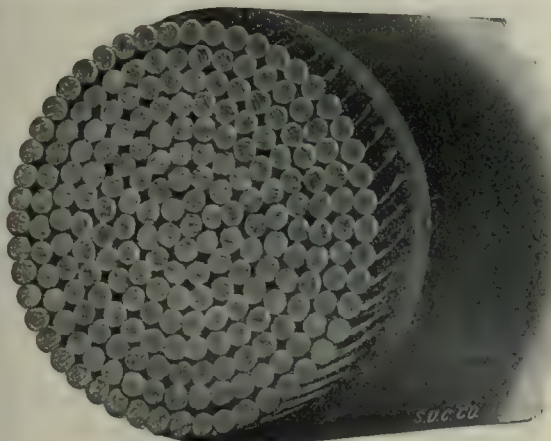
Repeat orders testify their general suitability for every Pole purpose. Telegraph, Telephone, Power Transmission, Electric Trolley Lines, Electric Lighting, etc. Highest class and most up-to-date steel pole equipment in the world. Our STEEL POLE TREATISE tells the story. Ask for it.

About 2000 tons of steel constantly on hand; immediate shipments and lowest prices.

Tubular Steel Poles cost 50 per cent. more than Bates Steel Poles, yet Bates Poles are 100 per cent. stronger — will last 100 per cent. longer, cover a much broader range of adaptability and are much more artistic than Tubular Poles; ask us to verify these facts.

## Bates Expanded Steel Truss Co.

208 S. La Salle St.  
Chicago, Ill.  
U. S. A.



5,000,000 C.M. Weatherproof Cable

## Our Facilities

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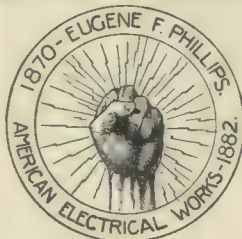
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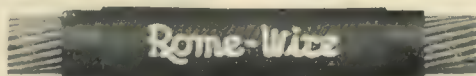
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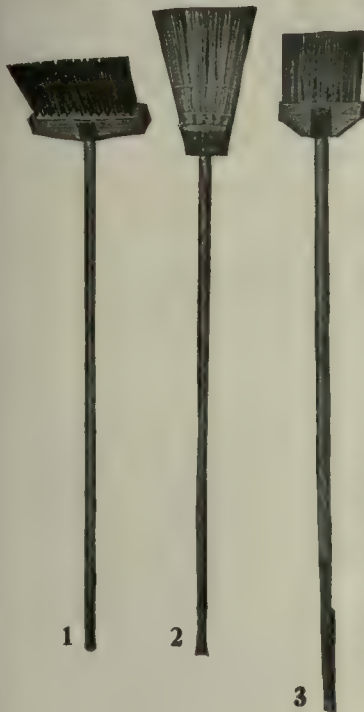
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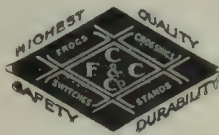
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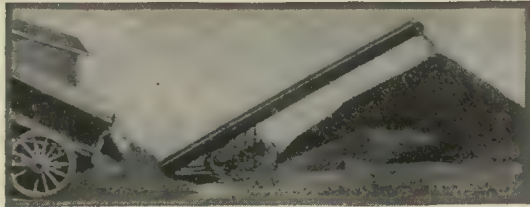
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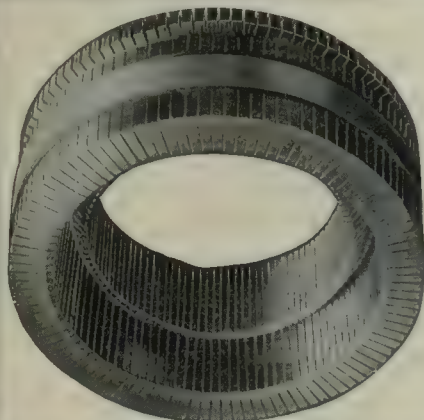
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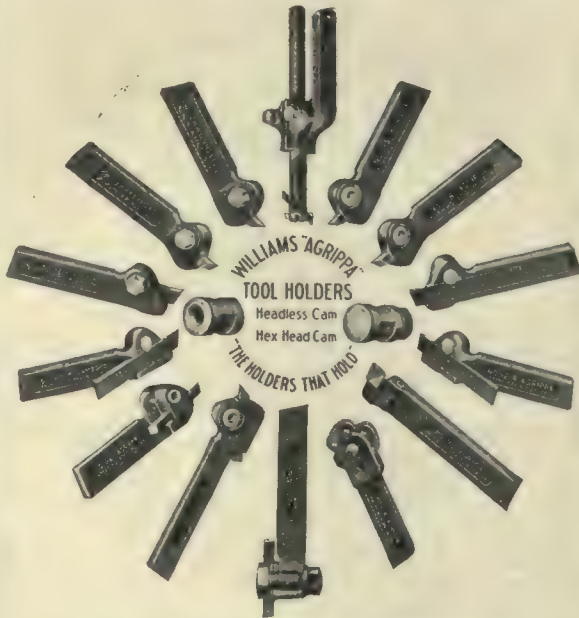


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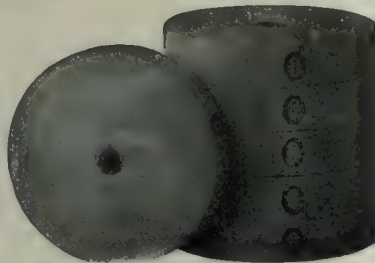
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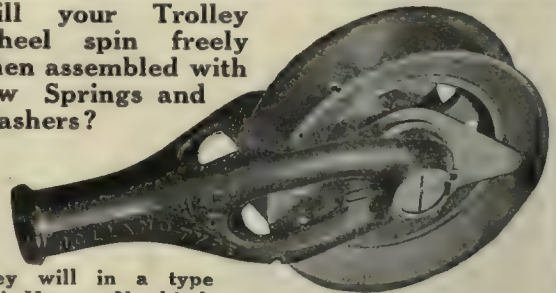
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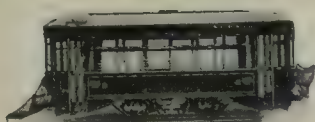
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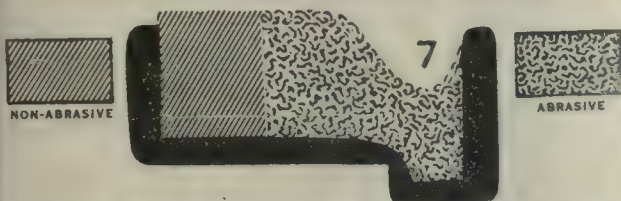
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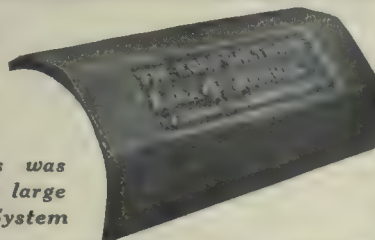


Cut No. 7 is used for cutting down flange and part of tread next to flange, but does not operate on outer edge of tread. This is done with the car in service. No pull-ins necessary. Cut above represents one of many styles of grinding shoes. Send for further data

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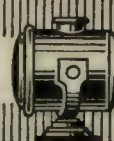




# SEARCHLIGHT



# SECTION



## POSITIONS VACANT

A technically educated engineer wanted, with street railway experience, to act as assistant of general superintendent specializing on car equipment, practices and economy. P-349, Elec. Ry. Journal, Leader-News, Bldg., Cleveland.

HIGH-GRADE master mechanic wanted for street railway system in Texas city of 25,000. P-342, Elec. Ry. Journal, Chicago.

LIGHTING company creating new position of superintendent, who will take charge of distribution system, outside work, two power stations of about 6,000 K.W. capacity. Applicant must have thorough experience in station operation and acted at one time in the capacity of superintendent in charge of distribution system. Located Central Pennsylvania. P-347, Elec. Ry. Journal.

ONE armature winder wanted. Tulsa Street Railway Co., Tulsa, Oklahoma.

STEAM engineer wanted, capable of taking full charge of electric light plant and pumping station, one 500 kilowatt and one 1000 kilowatt Allis-Chalmers turbines. City, 7000 population, located in the Middle West. Salary to start, \$1,800. P-354, Elec. Ry. Journal, Chicago.

THREE armature winders wanted. Michigan Railway Co., Albion, Mich.

## POSITIONS WANTED

ASSISTANT to chief engineer or general manager; 14 years' experience construction, operations, and engineering; general knowledge of mechanical, electrical transportation and accounting matters as related to way and structure department. Technically trained. PW-340, Elec. Ry. Journal.

ATTENTION—Street railway engineer over 10 years' experience, having been honorably discharged as major engineer U. S. Army after 20 months' service, desires to locate with growing concern where energy, strict application to duty and sound common sense methods are essentials. Have had considerable experience in revaluation work heavy power house and building construction, power, installation and maintenance. Would consider management or organization. PW-336, Elec. Ry. Journal.

AUDITOR, 10 years' experience, thoroughly conversant with Interstate Commerce Commission and Public Service Commission requirements. Best of reference. PW-352, Elec. Ry. Journal.

ELECTRIC car house foreman desires position; age, 34; married; honest and reliable. Best of references furnished. PW-355, Elec. Ry. Journal.

ENGINEER maintenance of way and construction engineer, technical, 15 years' experience street and interurban railways, all types track construction, designs railway structures. Extensive valuations. Age 37, married. References exchanged. PW-348, Elec. Ry. Journal, Chicago.

MARRIED man, 9 years experience in claim department of large city and interurban company, wishes to make change. Seeks position as chief or assistant chief claim agent. PW-353, Elec. Ry. Journal, Leader-News Bldg., Cleveland.

MASTER mechanic, 15 years' experience in shops of largest city and interurban lines in the country; 34 years old; single; can give best of references. Central states preferred, but will consider reasonable offer from other territory. PW-356, Elec. Ry. Journal, Chicago.

## POSITIONS WANTED

POSITION wanted as car barn foreman, experienced electrician and armature winder, familiar with electric car equipment and maintenance. 33 years old, and married. F. H., 736 Grove Ave., Moxham, Johnstown, Pa.

POSITION wanted as working barn foreman, single truck road preferred. Can wind armatures, do any kind of wiring and controller repair. 10 years' experience both single and double truck. PW-344, Elec. Ry. Journal, Phila.

RAILWAY electrical engineering graduate with testing experience on all types of Westinghouse control desires position. Just returned from overseas serving as naval aviator. PW-350, Elec. Ry. Journal, Chicago.

WITH leading consulting engineers for 12 years in responsible charge of administrative and engineering work for electrical utilities. Technical graduate. References unconditional. Available within one month. PW-351, Elec. Ry. Journal.

## AGENTS AND SALESMEN

Electrical Supply Salesman Wanted With several years' experience (both in purchase and sales preferred) who commands a wide Chicago acquaintance, and an established trade can better his position by addressing fully. AS-333, Elec. Ry. Journal, Chicago.

## WANTED

Swing Lathe Wanted Heavy duty 48 in. swing lathe, 14 in to 16 in. bed, tringle geared, A-1 condition. Elmira Water, Light & R.R. Co., Elmira, N. Y.

## FOR SALE

### One complete equipment of H-L CONTROL

Has been entirely overhauled and put in first-class condition.

TRANSIT EQUIPMENT COMPANY  
501 Fifth Ave., New York

## RAILS

15,000 TONS—NEW and RELAYERS  
NEW—12 lb., 16 lb., 20 lb., 25 lb., 30 lb., 40 lb., 60 lb., 70 lb., 75 lb., 80 lb., 85 lb., 90 lb.

RELAYERS—30 lb., 35 lb., 40 lb., 45 lb., 55 lb., 60 lb., 70 lb., 80 lb., 85 lb., 90 lb., 100 lb.

Fastenings, New Bolts, Nuts and Spikes. New Frogs, Switches, Crossings and all accessories. Carload and less carload inquiries and orders a specialty. Rails cut to lengths for structural purposes. Attractive prices. Immediate shipments from stock.

L. B. FOSTER COMPANY  
Park Bldg., Pittsburgh, Pa.

## FOR SALE

### Engineers' Library For Sale

With sectional book cases, 82 volumes, miscellaneous subjects. For detailed list of subjects and prices, write G. A. Bengel, 808 South 4th St., Springfield, Illinois.

## U. S. GOVERNMENT SALES

### Sale of Boilers

Material Disposition Section Chemical Warfare Service, U. S. A., 19 West 44th Street, New York City. Sealed bids are requested for either or both of 2 new and unused 604 hp. Babcock & Wilcox Boilers with accessories and breeching; now located at the plant of the Astoria Light, Heat & Power Company, Shore Road & Winthrop Ave., Astoria, L. I. Bids made on Form M. D. 16, obtainable from this office, containing complete information and other details, will be received until 3 p. m. March 11th, 1919.

## CLEVELAND ARMATURE WORKS

Incorporated  
Cleveland, Ohio

### Everything in the Line of Repairs to Electrical Machinery

Complete Armatures, New Armatures, Rewound Armature Cores, Armature Shafts, Armature Coils, Fields and Commutators.

Established 22 Years

## Cars For Sale

12 Double Truck Motor or Trailers. Brill 27-F trucks, 28-ft. closed bodies.

## 3 SNOW PLOWS

2 single, 1 double truck

ELECTRIC EQUIPMENT CO.  
Commonwealth Bldg. Philadelphia, Pa.



### Armature Coil Taping Machine

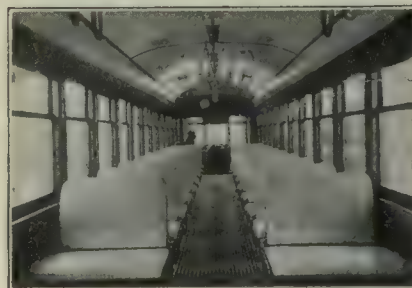
Saves Time,  
Labor and Money

A boy can tape 40 coils for Westinghouse 12A Armature in an hour. Further particulars gladly furnished.

Geo. M. Griswold Machine Co.  
New Haven, Conn.



# United States Shipping Board Emergency Fleet Corporation



**Bids**—For the purchase, f.o.b. cars Philadelphia, of any number of cars up to and including six, will be received by J. W. Smith, Manager Passenger Transportation and Housing Division, United States Shipping Board Emergency Fleet Corporation, No. 140 North Broad Street, Philadelphia.

**Delivery**—Immediate.

**Terms**—25% sight draft. Balance to be arranged.

**General**—Cars and equipment are entirely new, are open to inspection on request at the works of the manufacturer, the J. G. Brill Company, and cost, as is, \$13,570 each.

## SPECIFICATIONS

### BODY

Length over anti-climbers, 45 ft. 6 in.  
Length over corner posts, 33 ft. 0 in.  
Length over vestibules, 44 ft. 2 in.  
Extreme width, 8 ft. 6 in.  
Height from rail over trolley board, 11 ft. 8 in.  
Truck centers, 21 ft. 0 in.  
Radius of shortest curve, 35 ft.  
Seating capacity, 50  
Sheathing (sheet steel) 3/32 in.  
Doors, Hand operated  
Headlight, Crouse Hinds "Imperial"  
Registers, International R-7  
Fare Boxes, International G-15  
Heater, 1—Peter Smith Hot Air  
Hand Brakes, National

### AIR EQUIPMENT

G.E. Straight-Air Compressor C.P.-27

### TRUCKS

Brill 77 E-1                      Wheel Base, 5 ft. 9 in.  
Diameter of Wheel, 33 in.  
Tread, 3 in.  
Flange, 3/4 x 7/8 in.  
Axle in Motor Bearing, 4 1/2 in.  
Axle in Gear Seat, 5 in.  
Gauge of Track, 4 ft. 8 1/2 in.

### MOTOR EQUIPMENT

4 Westinghouse 514 A-600 volt 40 H.P. Motors  
Double end K-35 G-2 Control  
Solid Gears—58 teeth                      Pinions—15 teeth

### PERFORMANCE

The free running speed on tangent level track and 525 volts will be 30-31 m.p.h. with car carrying 50 passengers.

### WEIGHT

Light, 42240                      With 50 passengers, 49740



**ROTARY CONVERTERS**

- 1—300-kw. Westinghouse Rotary Converter, 3-ph., 60-cy., 370-v. A.C., 575-v. D.C., 600 r.p.m.  
 1—200-kw. Westinghouse Rotary Converter, 3-ph., 60-cy., 370-v. A.C., 575-v. D.C.  
 1—150-kw. Westinghouse Rotary Converter, 2 or 3-ph., 60-cy., 250-v. D.C., 720 r.p.m.

**TURBINE**

- 1—500-kw. Westg. Horizontal, 3-ph., 60-cy., 370-v. (can be rewound for any standard voltage), 3600 r.p.m., with or without condensing equipment.

**ARCHER & BALDWIN, INC.**

114-118 Liberty St., New York, N. Y.

Telephone 4337-4338 Rector

**IMMEDIATE DELIVERY**

Five new P.A.Y.E. double truck cars. Length, 45-ft. Equipped with 4GE Co.'s 247 Motors and G. E. Co. Air Brakes.

**McGUIRE-CUMMINGS MANUFACTURING CO.**

Cars and Trucks, Snow Sweepers, Electric Locomotives  
 111 West Monroe Street, Chicago, Ill.

**WATER TUBE BOILERS**

- 2—981 hp. Edge Moor, 235 lb. pressure.  
 1—450 hp. Heine, 170 lb. pressure.  
 4—400 hp. Stirling, 150 lb. pressure.  
 1—380 hp. Stirling, 150 lb. pressure.  
 2—360 hp. Erie City, 160 lb. pressure.  
 1—310 hp. Stirling, 200 lb. pressure.  
 6—308 hp. Heine, 140 lb. pressure.  
 1—305 hp. Babcock & Wilcox, 160 lb. pressure.  
 12—264 hp. Babcock & Wilcox, 175 lb. pressure.  
 8—250 hp. Stirling, 160 lb. pressure.  
 1—212 hp. Babcock & Wilcox, 160 lb. pressure.  
 2—204 hp. Babcock & Wilcox, 160 lb. pressure.

**MacGovern & Company, Inc.**

114 Liberty St., New York, N. Y.  
 Pittsburgh Office: 498 Union Arcade Bldg.

**Some One Wants to Buy**

the equipment or machinery  
 that you are not now using.

This may be occupying valuable  
 space, collecting dust, rust and hard  
 knocks in your shops and yards.

**Sell it Before depreciation Scraps it.**

*The Searchlight Section is helping others  
 —let it help you also.*

805

**OFFERED FOR SALE****PINIONS**

No.	Motor	No. Teeth
6	GE 57	24
6	GE 57	21
17	GE 216	17
47	GE 67	47

**GEARS**

No.	Motor	No. Teeth
5	GE 216	69
11	GE 57	61
32	GE 67	63

For further information address

**General Storekeeper**  
**PUBLIC SERVICE RAILWAY CO.,**  
 Newark, N. J.

**STREET CARS**

(4 ft. 8½ in. gage)

3—32 ft. Closed.

Complete with equipment. First-Class.  
 Will convert to one-man type.

4—9 Bench Open Trailers

Immediate Shipment

**ZELNICKER IN ST. LOUIS**

Get Bulletin 250—88 pages.  
 Circulation, One Quarter Million.  
 Railway, Power Plant & Industrial Equip.

**FOR SALE**

8 New Tomlinson  
**Automatic  
 Couplers**

Form 8

Complete Equipment

**TRANSIT EQUIPMENT COMPANY**  
 501 Fifth Avenue, New York

**FOR SALE  
CARS**

- 2—McKean Gaso-Electric Cars.  
 12—Differential 20-yd. Cars.  
 5—Gasoline Passenger Cars.  
 50—Freight Cars.  
 12—Electric Sets.

Get our Lists and Prices

J. F. DONAHOO CO. Birmingham, Ala.

**FOR SALE  
MOTORS**

- 10—Westinghouse 68 C individual, less gears,  
 pinions and gear jages, but all bearings if  
 desired. In good mechanical and electrical  
 running order. Also 15 K 11 A controllers.

Good condition.

Address W. H. SMAW, Pur. Agt.  
 Georgia Ry. & Power Co., Atlanta, Ga.

**CAN SHIP AT ONCE. The following:****BRIDGES**

good as new. Steel Girder, all Cooper E-35 with 33% overload		
2—27 ft. 6 in. through plate girder	Total weight 771,034 lbs.	
1—29 ft. through plate girder		
4—32 ft. 6 in. through plate girder		
4—42 ft. 6 in. through plate girder		
2—54 ft. 2 in. through plate girder		
2—59 ft. through plate girder		
1—64 ft. 5 in. through plate girder		
2—64 ft. 5 in. through plate girder		
2—64 ft. 11 in. through plate girder		
1—24 ft. Deck span		
1—43 ft. Deck span		
2—48 ft. Deck span		
1—111 ft. Truss span	Weight 120,479 lbs. Total weight 265,650 lbs. 39,170 lbs.	
12—30 ft. Deck spans (Viaduct)		
2—43 ft. Deck spans (Viaduct)		
2—60 ft. Deck spans (Viaduct)		
6—Towers and 2 single bents		

**M. K. FRANK**  
 Frick Bldg., Pittsburg, Pa.



We own and offer for sale  
 a used McKean Motor 71-  
 Passenger Car, all steel.  
 In first class condition.  
 Write or wire us for fur-  
 ther information.

**HYMAN-MICHAELS CO.**

People's Gas Building, Chicago  
 Phone: Harrison 1100

New and Relaying Rails

BUYERS OF ABANDONED RAILROADS





## UNITED STATES SHIPPING BOARD EMERGENCY FLEET CORPORATION



Exterior View



Interior View

Bids for the purchase, f.o.b cars, Philadelphia, of one snow plow will be received by J. W. Smith, Manager, Division of Passenger Transportation and Housing, United States Shipping Board Emergency Fleet Corporation, 140 North Broad Street, Philadelphia.

**Delivery**—Immediate

**Terms**—25% sight draft, balance to be arranged

**General**—The plow and equipment is entirely new, is open to inspection on request, at the works of the manufacturer, the J. G. Brill Company, Philadelphia and cost, as is, \$13,134.

### SPECIFICATIONS

Length over all.....	41 ft. 4 in.
Length over end body sheathing.....	31 ft. 6½ in.
Length of body inside.....	30 ft. 9 in.
Width over side body sheathing.....	7 ft. 6 in.
Width over body inside.....	6 ft. 8½ in.
Width over all wings closed not to exceed .....	8 ft. 10 in.
Width over all wings open.....	12 ft. 9 in.
Height from bottom of sill to top roof..	8 ft. 0 in.
Height from top of rail to bottom sill	2 ft. 6½ in.
Height of body inside—clear.....	6 ft. 4 in.
Height from top of rail to top of trolley stand .....	10 ft. 9¼ in.
Height of share blades.....	5 ft. 0 in.

### DIMENSIONS OF MAIN TIMBERS

Side sills .....	4¾ in. x 11½ in.
Intermediate sills .....	5 in. x 3 in.
Cross timbers .....	4 in. x 7 in.
Side posts .....	2¾ in. x 4 in.
Side posts at truss.....	2¾ in. x 5 in.
Flooring, single .....	1¾ in.
Lift of plow share.....	6 in.
Lift of digger.....	3 in.
Gauge .....	4 ft. 8½ in.
To operate on curve of.....	35 ft. radius

### AXLE

Open hearth steel, 4½-in. x 8-in. journal, 5⅞-in. wheel fit, 5½-in. gear fit, 5-in. dia. motor fit.

### AIR BRAKES

Westinghouse Traction Brake Co.'s schedule A M M automatic with graduated release and emergency straight air feature.

- 1—D-2 E G 25-ft. compressor.
- 1—Brake cylinder, 10 x 12 in.
- 2—Main reservoirs 16 x 42 in.

### HAND BRAKES

Furnished and applied by Car Builder.

### DIGGER

Double truck standard, four per plow, arranged to operate from both ends of plow.

### DRAW BARS

Special, radial M.C.B. applied as per B/P 6952, to couple with Tomlinson and spring carrier.

### DOORS

Side doors 5-ft. wide.

### JOURNALS

M.C.B. 4¼ in. x 8 in.

### LETTERING

As required by the Railroad Company.

### MOTOR EQUIPMENT

- 4—Gen. Elect. 201-G, 65 hp.
- 2—K-35 G-2 controllers and equipment.
- 71-tooth solid gears.
- 15-tooth pinions.

### PAINTING

Outside, freight car standard; inside, brown.

### SPREADERS

12 ft. 0 in. long, furnished by Car Builder.

### SAND SPOUTS

Standard for eight-wheel plow.

### ROOF

¾ in. thick, white pine, covered with duck.

### SIDES

¾-in. sheathing.

### TRUCKS

Brill standard 53 F for 8-wheel plow—4 diggers.

### TRUCK CENTERS

14 ft. 0 in.

### TRUCK WHEEL BASE

4 ft. 0 in.

### SHARE LIFTING DEVICE

Standard pneumatic (air.) We furnish and apply 2—8-in. cylinders, 2—½-in. engineers valves complete and 1 engineers handle.

### WINGS

Rear wings to be steel plates.

### WHEELS

33-in. cast iron, 3-in. tread, ⅞-in. flange.

### NOTICE

Apparatus to be located that motormen will be in R. H. corner and can look out of window.

### WEIGHT

Complete weight, 56,920 lb.



# WHAT AND WHERE TO BUY

Equipment, Apparatus and Supplies Used by the Electric Railway Industry with  
Names of Manufacturers and Distributors Advertising in this Issue

## Acetylene Service Apparatus

Oxweld Acetylene Co.

## Advertising, Street Car.

Collier, Inc., Barron G.

## Air Rectifiers.

Holden & White, Inc.

## Anchors, Guy.

Electric Service Supplies Co.  
Holden & White, Inc.  
Johns-Manville Co., H. W.  
Ohio Brass Co.  
Westinghouse Elec. & M. Co.

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White Co.

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## Axles.

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Brill Co., The J. G.  
Carnegie Steel Co.  
National Railway Appliance Co.  
St. Louis Car Co.  
Standard Steel Truck Co.  
Taylor Elec. Truck Co.  
Westinghouse Elec. & M. Co.

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Nichols-Lintern Co.

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Eureka Co.  
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More-Jones Brass & M. Co.  
St. Louis Car Co.  
Taylor Elec. Truck Co.  
Westinghouse Elec. & M. Co.

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Columbia M. W. & M. I. Co.  
Electric Service Supplies Co.  
St. Louis Car Co.

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Watson-Stillman Co.  
Western Electric Co.  
Zelnicke Supply Company, Inc.,  
Walter A.

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Johns-Manville Co., H. W.

## Boiler Coverings.

Johns-Manville Co., H. W.

## Boiler Tubes.

National Tube Co.

## Boilers.

Babcock & Wilcox Co.

## Bond Testers.

American Steel & Wire Co.  
Lincoln Bonding Co.

## Bonding Apparatus.

Electric Railway Improvement Co.  
Lincoln Bonding Co.  
Ohio Brass Co.  
Oxweld Acetylene Co.

## Bonding Tools.

American Steel & Wire Co.  
Electric Service Supplies Co.  
Ohio Brass Co.

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Electric Railway Improvement Co.  
Electric Service Supplies Co.  
General Electric Co.  
Johns-Manville Co., H. W.  
Lincoln Bonding Co.  
Ohio Brass Co.  
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St. Louis Car Co.  
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## Car Equipment. (For Fenders,

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St. Louis Car Co.  
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General Electric Co.

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American Steel Foundries.  
Columbia M. W. & M. I. Co.  
Eureka Co.  
More-Jones Brass & M. Co.

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Bemis Car Truck Co.  
Columbia M. W. & M. I. Co.  
St. Louis Car Co.  
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Columbia M. W. & M. I. Co.  
St. Louis Car Co.

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American Railway Supply Co.

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Westinghouse Elec. & M. Co.

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General Electric Co.

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chinery.)

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Cleveland Armature Works  
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## Converters, Rotary.

General Electric Co.  
Westinghouse Elec. & M. Co.

## Conveying and Hoisting Machinery.

Columbia M. W. & M. I. Co.  
Green Eng'g Co.

## Conveyors, Belt.

Portable Machinery Co.

## Conveyors, Coal and Ash.

Portable Machinery Co.

## Conveyors, Portable

Portable Machinery Co.

## Cord, Bell, Trolley, Register, Etc.

Brill Co., The J. G.  
Electric Service Supplies Co.  
International Register Co., The  
Roebing's Sons Co., John A.  
Samson Cordage Works.  
Trolley Supply Co.

## Cord Connectors and Couplers.

Electric Service Supplies Co.  
Samson Cordage Works.  
Wood Co., C. N.

## Couplers, Car.

Brill Co., The J. G.  
Ohio Brass Co.  
Van Dorn Coupler Co.  
Westinghouse Trac. Brake Co.

## Cranes. (See also Hoists.)

Niles-Bement-Pond Co.  
Toledo Bridge & Crane Co., The

## Cresosoting. (See Wood Preserva-

tives.)

## Cross Arms. (See Brackets.)

## Crossing Foundations.

International Steel Tie Co.

## Crossing Signals. (See Signals,

Crossing.)

## Crossings, Track. (See Track,

Special Work.)

## Culverts.

Canton Culvert & Silo Co.

## Curtains and Curtain Fixtures.

Brill Co., The J. G.  
Electric Service Supplies Co.  
Pantastote Co.  
St. Louis Car Co.

## Cutting Apparatus, Oxy-Acetylene.

Oxweld Acetylene Co.

## Dealers' Machinery.

Archer & Baldwin  
Cleveland Armature Wks.  
Electric Equipment Co.  
Foster Co., L. B.  
Griswold Machine Co., Geo. M.  
Hyman Michaels Co.  
MacGovern & Co., Inc.  
Zelnicke Supply Co., W. A.

## Derailing Devices.

Cleveland Frog & Crossing Co.

## Destination Signs.

Columbia M. W. & M. I. Co.  
Creaghead Engrg. Co.  
Electric Service Supplies Co.

## Detective Service.

Wish Service P. Edward

## Dogs, Lathe.

Williams & Co., J. H.

## Door Operating Devices.

Consolidated Car Heating Co.  
National Pneumatic Co., Inc.  
Safety Car Devices Co.

## Doors, Asbestos.

Johns-Manville Co., H. W.

## Doors and Door Fixtures.

Brill Co., The J. G.  
Hale & Kilburn Corp.

## Doors, Folding Vestibule.

National Pneumatic Co., Inc.

## Draft Rigging. (See Couplers,

Car.)

## Drills, Track.

American Steel & Wire Co.  
Electric Service Supplies Co.  
Niles-Bement-Pond Co.  
Ohio Brass Co.





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## WHAT AND WHERE TO BUY

- Dryers, Sand.**  
Electric Service Supplies Co.  
Zelnicker Supply Co., Inc., W. A.
- Electrical Wires and Cables.**  
Roebbling's Sons Co., J. A.
- Engineers, Consulting, Contracting and Operating.**  
Archbold-Brady Co.  
Arnold Co., The  
Beeler, John A.  
Byllesby & Co., H. M.  
Drum & Co., A. L.  
Ford, Bacon & Davis  
Holst, Engelhardt W.  
Republic Engineers Inc.  
Richey, Albert S.  
Sanderson & Porter  
Sargent & Lundy  
Scofield Engineering Co.  
Stone & Webster  
White Companies, The J. G.  
Woodmansee & Davidson Engineering Co.
- Engines, Gas and Oil.**  
Westinghouse Elec. & M. Co.
- Engines, Steam.**  
Westinghouse Elec. & M. Co.
- Fare Boxes.**  
Brill Co., The J. G.  
Cleveland Fare Box Co.  
International Register Co., The  
National Railway Appliance Co.  
Ohmer Fare Register Co.
- Fences, Woven Wire and Fence Posts.**  
American Steel & Wire Co.  
Page steel & Wire Co.
- Fenders and Wheel Guards.**  
Brill Co., The J. G.  
Cleveland Fare Box Co.  
Consolidated Car Fender Co.  
Electric Service Supplies Co.  
Star Brass Works  
Trolley Supply Co.  
Wood Co., Charles N.
- Fibre and Fibre Tubing.**  
Johns-Manville Co., H. W.  
Westinghouse Elec. & M. Co.
- Field Coils. (See Coils.)**
- Filters, Water.**  
Scaife & Sons Co., Wm. B.
- Fire-Extinguishing Apparatus.**  
Johns-Manville Co., H. W.
- Fire-Extinguishing Liquid.**  
Castle Co., J. M.
- Fire-Proofing Materials.**  
Johns-Manville Co., H. W.
- Floodlights.**  
Crouse-Hinds Co.  
Electric Service Supplies Co.
- Flooring, Composition.**  
American Mason Safety Tread Co.  
Johns-Manville Co., H. W.
- Forgings.**  
Columbia M. W. & M. I. Co.  
Eureka Co.  
Standard Steel Works Co.
- Fuses and Fuse Boxes.**  
Columbia M. W. & M. I. Co.  
D & W Fuse Co.  
General Electric Co.  
Johns-Manville Co., H. W.  
Westinghouse Elec. & M. Co.  
Williams & Co., J. H.
- Fuses, Refillable.**  
Columbia M. W. & M. I. Co.  
Economy Fuse & Mfg. Co.  
General Electric Co.
- Gages, Oil and Water.**  
Ohio Brass Co.
- Gaskets.**  
Johns-Manville Co., H. W.  
Power Specialty Co.  
Westinghouse Trac. Brake Co.
- Gas-Electric Cars.**  
General Electric Co.
- Gas Producers.**  
Westinghouse Elec. & M. Co.
- Gates, Car.**  
Brill Co., The J. G.
- Gear Blanks.**  
Carnegie Steel Co.  
Standard Steel Wks. Co.
- Gear Cases.**  
Columbia M. W. & M. I. Co.  
Electric Service Supplies Co.  
Westinghouse Elec. M. Co.
- Gears and Pinions.**  
Bemis Car Truck Co.  
Columbia M. W. & M. I. Co.  
Electric Service Supplies Co.  
General Electric Co.  
National Ry. Appliance Co.  
Nuttall Co., R. D.
- Generating Sets, Gas-Electric.**  
General Electric Co.
- Generators.**  
Dick, Kerr & Co.  
General Electric Co.  
Westinghouse Elec. & M. Co.
- Gongs. (See Bells and Gongs.)**
- Graphite.**  
Morgan Crucible Co.
- Grates, Chain.**  
Green Eng'g Co.
- Greases. (See Lubricants.)**
- Grinding Blocks & Wheels.**  
Railway Track-work Co.
- Grinders and Grinding Supplies.**  
Indianapolis Switch & Frog Co.  
Metal & Thermit Corp.  
Railway Track-work Co.
- Guards, Trolley.**  
Electric Service Supplies Co.  
Ohio Brass Co.
- Haps, Trolley.**  
Anderson M. Co., A. & J. M.  
Electric Service Supplies Co.  
Hensley Trolley & Mfg. Co.  
Holland Trolley Supply Co.  
More-Jones Brass & M. Co.  
Nuttall Co., R. D.  
Star Brass Works
- Headlights.**  
Crouse-Hinds Co.  
Electric Service Supplies Co.  
General Electric Co.  
Ohio Brass Co.  
St. Louis Car Co.  
Trolley Supply Co.
- Headlining.**  
Pantasote Co.
- Heaters, Car, Electric.**  
Consolidated Car Heating Co.  
Gold Car Heating & Lighting Co.  
Smith Heater Co., Peter
- Heaters, Car, Hot Air and Water.**  
Cooper Heater Co.  
Smith Heater Co., Peter
- Heaters, Car, Stove.**  
Electric Service Supplies Co.  
Smith Heater Co., Peter
- Hoists and Lifts.**  
Columbia M. W. & M. I. Co.  
Ford Chain Block & Mfg. Co.  
Niles-Bement-Pond Co.  
Toledo Bridge & Crane Co., The  
Yale & Towne Mfg. Co.
- Holders, Tool.**  
Williams & Co., J. H.
- Hose Bridges.**  
Ohio Brass Co.
- Hose, Pneumatic & Fire.**  
Johns-Manville Co., H. W.
- Hydraulic Machinery.**  
Niles-Bement-Pond Co.  
Watson-Stillman Co.
- Inspection.**  
Elec'l Testing Laboratories
- Instruments, Measuring, Testing and Recording.**  
Economy Electric Devices Co.  
General Electric Co.  
Western Electric Co.  
Westinghouse Elec. & M. Co.  
Weston Elec'l Instrument Co.
- Insulating Cloths, Paper and Tape.**  
Anchor Webbing Co.  
General Electric Co.  
Hope Webbing Co.  
Irrington Varnish & Insulator Co.  
Johns-Manville Co., H. W.  
Mitchell-Rand Mfg. Co.  
Okonite Co.  
Standard Paint Co.  
Standard Underground Cable Co.  
Standard Woven Fabric Co.  
Westinghouse Elec. & M. Co.
- Insulation. (See Also Paints.)**  
Anderson M. Co., A. & J. M.  
Electric Service Supplies Co.  
General Electric Co.  
Johns-Manville Co., H. W.  
Mitchell-Rand Mfg. Co.  
Okonite Co.  
Westinghouse Elec. & M. Co.
- Insulators. (See also Line Material.)**  
Anderson M. Co., A. & J. M.  
Creshead Engrg. Co.  
Drew Elec. & Mfg. Co.  
Electric Railway Equipment Co.  
Electric Service Supplies Co.  
General Electric Co.  
Johns-Manville Co., H. W.  
Macallen Co.  
Ohio Brass Co.  
Westinghouse Elec. & M. Co.
- Insulator Pins.**  
Electric Service Supplies Co.  
Hubbard & Co.
- Insurance, Fire.**  
Marsh & McLennan
- Inventions, Developed and Per-fected.**  
Peters & Co., G. D.
- Jacks. (See also Cranes, Hoists and Lifts.)**  
Brill Co., The J. G.  
Buckeye Jack Mfg. Co.  
Columbia M. W. & M. I. Co.  
National Ry. Appliance Co., Ltd.  
Templeton, Kenly & Co., Ltd.  
Watson-Stillman Co.
- Joints, Rail.**  
Carnegie Steel Co.  
Lackawanna Steel Co.  
Rail Joint Co.  
Zelnicker Supply Co., Inc., W. A.
- Journal Boxes.**  
Bemis Car Truck Co.  
Brill Co., The J. G.
- Junction Boxes.**  
Johns-Manville Co., H. W.  
Standard Underground Cable Co.
- Laboratories.**  
Elec'l Testing Laboratories
- Lamp Guards and Fixtures.**  
Anderson M. Co., A. & J. M.  
Electric Service Supplies Co.  
General Electric Co.  
Westinghouse Elec. & M. Co.
- Lamps, Arc and Incandescent.**  
Anderson M. Co., A. & J. M.  
General Electric Co.  
Westinghouse Elec. & M. Co.
- Lamps, Signal and Marker.**  
Nichols-Lintern Co.  
Ohio Brass Co.
- Lathes, Attachments.**  
Williams & Co., J. H.
- Lathes, Car Wheel.**  
Niles-Bement-Pond Co.
- Lighting Regulators, Car.**  
Holden & White, Inc.
- Lightning Protection.**  
Anderson M. Co., A. & J. M.  
Electric Service Supplies Co.  
General Electric Co.  
Ohio Brass Co.  
Westinghouse Elec. & M. Co.
- Line Material. (See also Brackets, Insulators, Wires, etc.)**  
Anderson M. Co., A. & J. M.  
Archbold-Brady Co.  
Columbia M. W. & M. I. Co.  
Creshead Engrg. Co.  
Dick, Kerr & Co.  
Drew Elec. & Mfg. Co.  
Electric Railway Equipment Co.  
Electric Service Supplies Co.  
Eureka Co.  
General Electric Co.  
Holden & White, Inc.  
Hubbard & Co.  
Johns-Manville Co., H. W.  
Macallen Co.  
More-Jones Brass & M. Co.  
Ohio Brass Co.  
Westinghouse Elec. & M. Co.
- Liquid, Fire-Extinguishing.**  
Castle Co., J. M.
- Locks.**  
Yale & Towne Mfg. Co.
- Locomotives, Electric.**  
Brill Co., The J. G.  
General Electric Co.  
McGuire-Cummings Mfg. Co.  
Westinghouse Elec. & M. Co.
- Lubricating Engineers.**  
Galena-Signal Oil Co.
- Lubricants, Oil and Grease.**  
Borne, Scrymser Co.  
Galena-Signal Oil Co.
- Lumber. (See Poles, Ties, Posts, etc.)**
- Machine Work.**  
Columbia M. W. & M. I. Co.  
Holden & White, Inc.
- Machine Tools.**  
Columbia M. W. & M. I. Co.  
Niles-Bement-Pond Co.  
Watson-Stillman Co.
- Manganese Parts.**  
Bemis Car Truck Co.
- Mats.**  
Johns-Manville Co., H. W.
- Meters, Car, Watthour.**  
Economy Electric Devices Co.
- Meters. (See Instruments.)**
- Mica.**  
Macallen Co.
- Mirrors for Motormen.**  
Drew Elec. & Mfg. Co.
- Motormen's Seats.**  
Electric Service Supplies Co.  
Wood Co., C. N.
- Motor Generator, Bonding and Welding.**  
Lincoln Bonding Co.
- Motors and Generators Sets.**  
General Electric Co.
- Motors, Electric.**  
British Westinghouse Elec. & Mfg Co.  
Dick, Kerr & Co.  
General Electric Co.  
Westinghouse Elec. & M. Co.
- Nuts and Bolts.**  
Barbour-Stockwell Co.  
Bemis Car Truck Co.  
Columbia M. W. & M. I. Co.  
Hubbard & Co.  
Lackawanna Steel Co.
- Oil Storage Systems.**  
Gilbert & Barber Mfg. Co.
- Oils. (See Lubricants.)**
- Overhead Equipment. (See Line Material.)**
- Oxy-Acetylene. (See Cutting Apparatus, Oxy-Acetylene.)**
- Packing.**  
Johns-Manville Co., H. W.  
Power Specialty Co.  
Westinghouse Trac. Brake Co.
- Packing Rings.**  
Johns-Manville Co., H. W.
- Paints and Varnishes. (Insulating.)**  
Holden & White, Inc.  
Irrington Varnish & Insulator Co.  
Johns-Manville Co., H. W.  
Mitchell-Rand Mfg. Co.  
Standard Paint Co.
- Paints and Varnishes. (Preservative.)**  
Johns-Manville Co., H. W.  
Standard Paint Co.
- Paints and Varnishes for Wood-work.**  
National Railway Appliance Co.
- Paving Material.**  
American B. S. & Fdry. Co.
- Pickups. (Trolley Wire.)**  
Electric Service Supplies Co.  
Ohio Brass Co.
- Pinion Pullers.**  
Columbia M. W. & M. I. Co.  
Electric Service Supplies Co.  
General Electric Co.  
Wood Co., C. N.
- Pinions. (See Gears.)**
- Pins, Case Hardened, Wood and Iron.**  
Bemis Car Truck Co.  
Electric Service Supplies Co.  
Ohio Brass Co.  
Westinghouse Trac. Brake Co.
- Pipe.**  
National Tube Co.
- Pipe Fittings.**  
Power Specialty Co.  
Standard Steel Works Co.  
Watson-Stillman Co.  
Westinghouse Trac. Brake Co.
- Pliers, Insulated.**  
Electric Service Supplies Co.  
National Railway Appliance Co.
- Pneumatic Hose.**  
Westinghouse Trac. Brake Co.
- Poles, Metal Street.**  
Bates Expanded Steel Truss Co.  
Electric Railway Equipment Co.  
Hubbard & Co.  
National Railway Appliance Co.
- Pole Sleeves.**  
Drew Elec. & Mfg. Co.
- Poles, Ties, Posts, Piling and Lumber.**  
Carney & Co., B. J.  
Lindley Bros. Co.  
Page & Hill Co.  
Valentine-Clark Co.  
White Marble Lime Co.
- Poles and Ties, Treated.**  
Lindsay Bros  
Page & Hill Co.  
Valentine-Clark Co.





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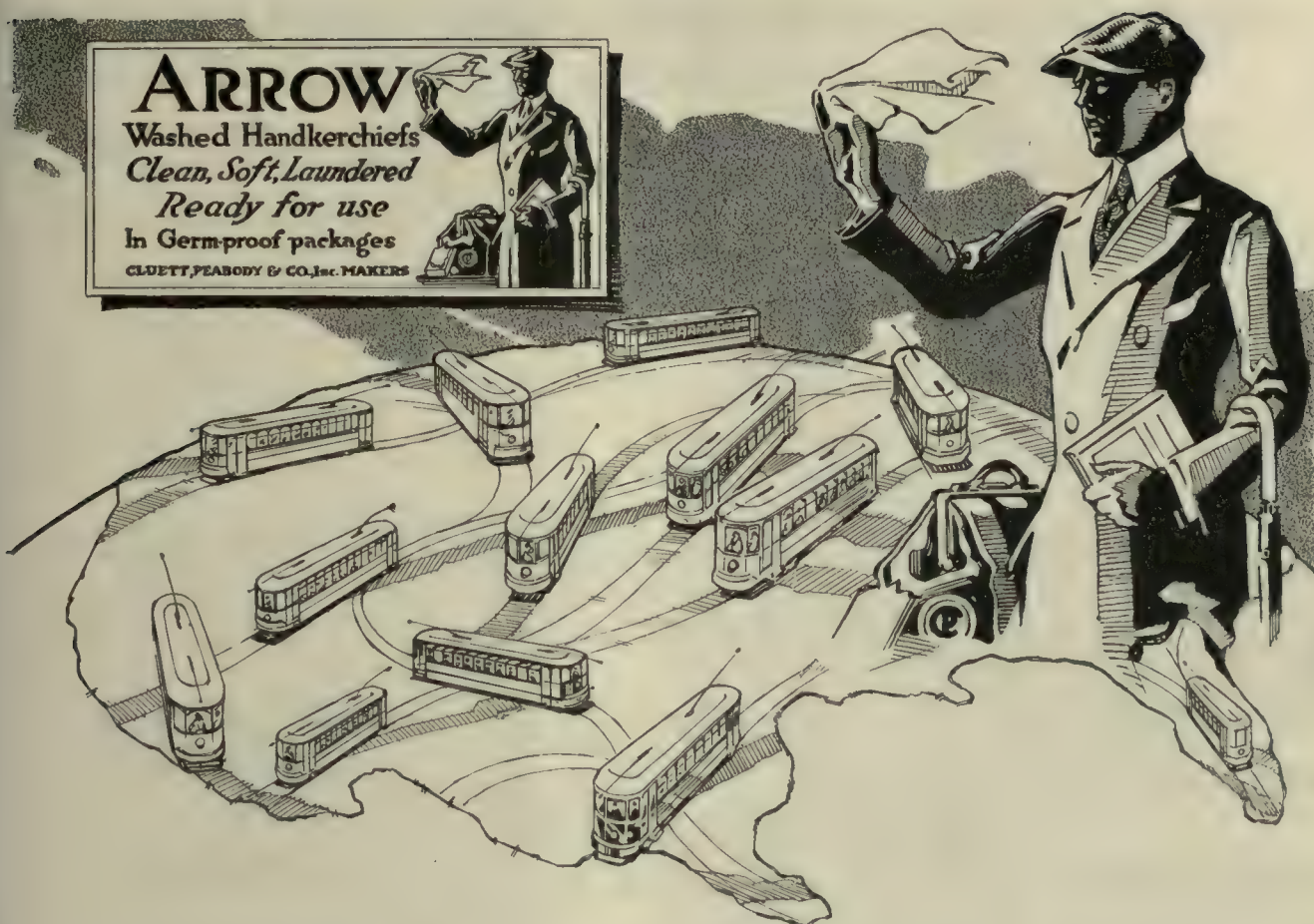
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## WHAT AND WHERE TO BUY

- Poles, Trolley.**  
Anderson M. Co., A. & J. M.  
Columbia M. W. & M. I. Co.  
Electric Service Supplies Co.  
Holland Trolley Supply Co.  
National Tube Co.  
Nuttall Co., R. D.
- Pole Reinforcing.**  
Hubbard & Co.
- Poles, Tubular Steel.**  
Electric Railway Equipment Co.  
National Tube Co.
- Power Saving Devices.**  
Arthur Power-Saving Recorder Co.
- Pressure Regulators.**  
General Electric Co.  
Ohio Brass Co.  
Westinghouse Trac. Brake Co.
- Pumps.**  
Watson-Stillman Co.
- Punches, Ticket.**  
American Railway Supply Co.  
Bonney-Vehslage Tool Co.  
International Register Co., The  
Wood Co., C. N.
- Punching Machinery.**  
Watson-Stillman Co.
- Purifiers, Feed Water.**  
Scaife & Sons Co., Wm. B.
- Rail Grinders.** (See Grinders.)
- Rails, Relaying.**  
Zelnicker Supply Company, Inc.,  
Walter A.
- Rail Welding.** (See Welding Processes and Apparatus.)
- Rattan.**  
Brill Co., The J. G.  
Electric Service Supplies Co.  
Hale & Kilburn Corp.  
McGuire-Cummings Mfg. Co.  
St. Louis Car Co.
- Recorders, Power Saving.**  
Arthur Power-Saving Recorder Co.
- Registers and Fittings.**  
Bonham Recorder Co.  
Brill Co., The J. G.  
Electric Service Supplies Co.  
International Register Co., The  
Ommer Fare Register Co.  
Rooke Automatic Register Co.
- Reinforcing Concrete.**  
American Steel & Wire Co.
- Repair Shop Appliances.** (See also Coil Banding and Winding Machines.)  
Columbia M. W. & M. I. Co.  
Electric Service Supplies Co.
- Repair Work.** (See also Coils, Armature and Field.)  
Cleveland Armature Works  
Columbia M. W. & M. I. Co.  
General Electric Co.  
Independent Lamp & W. Co.  
King-Coil Mfg. Co.  
Westinghouse Elec. & M. Co.
- Replacers, Car.**  
Columbia M. W. & M. I. Co.  
Electric Service Supplies Co.
- Resistance, Grid.**  
Columbia M. W. & M. I. Co.
- Resistance, Wire and Tube.**  
General Electric Co.  
Westinghouse Elec. & Mfg. Co.
- Retrievers, Trolley.** (See Catchers and Retrievers, Trolley.)
- Rheostats.**  
General Electric Co.  
Westinghouse Elec. & M. Co.
- Roofing Building.**  
Johns-Manville Co., H. W.  
Standard Paint Co.
- Roofing, Car.**  
Johns-Manville Co., H. W.  
Pantastote Co.
- Sanders, Track.**  
Brill Co., The J. G.  
Cleveland Fare Box Co.  
Columbia M. W. & M. I. Co.  
Electric Service Supplies Co.  
Holden & White, Inc.  
Nichols-Lintern Co.  
Ohio Brass Co.  
St. Louis Car Co.
- Sash Fixtures, Car.**  
Brill Co., The J. G.
- Sash, Metal Car Windows.**  
Hale & Kilburn Corp.
- Seating Material.** (See also Rattan.)  
Brill Co., The J. G.  
Pantastote Co.
- Seats, Car.**  
Brill Co., The J. G.  
Hale & Kilburn Corp.  
Peters & Co., G. D.  
St. Louis Car Co.
- Second-Hand Equipment.** (See Searchlight Section.)  
Archer & Baldwin  
Cleveland Armature Wks.  
Duquesne Elec. & Mfg. Co.  
Electric Equipment Co.  
Exell Mfg. Co.  
Foster Co., L. B.  
Griewold Machine Co., G. M.  
Hyman Michaels Co.  
MacGovern & Co.  
Zelnicker Supply Co., W. A.
- Shades, Vestibule.**  
Brill Co., The J. G.
- Shovels.**  
Hubbard & Co.
- Shovels, Power.**  
Blaw-Knox Co.
- Signals, Car.**  
Nichols-Lintern Co.
- Signals, Car Starting.**  
Electric Service Supplies Co.  
Consolidated Car Heating Co.  
National Pneumatic Co.
- Signals, Highway Crossing.**  
U. S. Electric Signal Co.
- Signal Systems, Block.**  
Electric Service Supplies Co.  
Federal Signal Co.  
Union Switch & Signal Co.  
U. S. Electric Signal Co.  
Wood Co., C. N.
- Slack Adjusters.** (See Brake Adjusters.)
- Sleet Wheels and Cutters.**  
Anderson M. Co., A. & J. M.  
Bonney-Vehslage Tool Co.  
Columbia M. W. & M. I. Co.  
Drew Elec. & Mfg. Co.  
Electric Railway Equipment Co.  
Holden & White, Inc.  
More-Jones Brass & M. Co.  
Nuttall Co., R. D.
- Snow-Plows, Removers, Sweepers, etc.**  
Brill Co., The J. G.  
Consolidated Car Fender Co.  
Columbia M. W. & M. I. Co.
- Soldering and Brazing Apparatus.** (See Welding Proc. & App.)
- Solderless Connectors.**  
Westinghouse Elec. & Mfg. Co.
- Speed Indicators.**  
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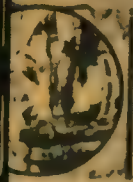


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H. W. BLAKE, *Editor*

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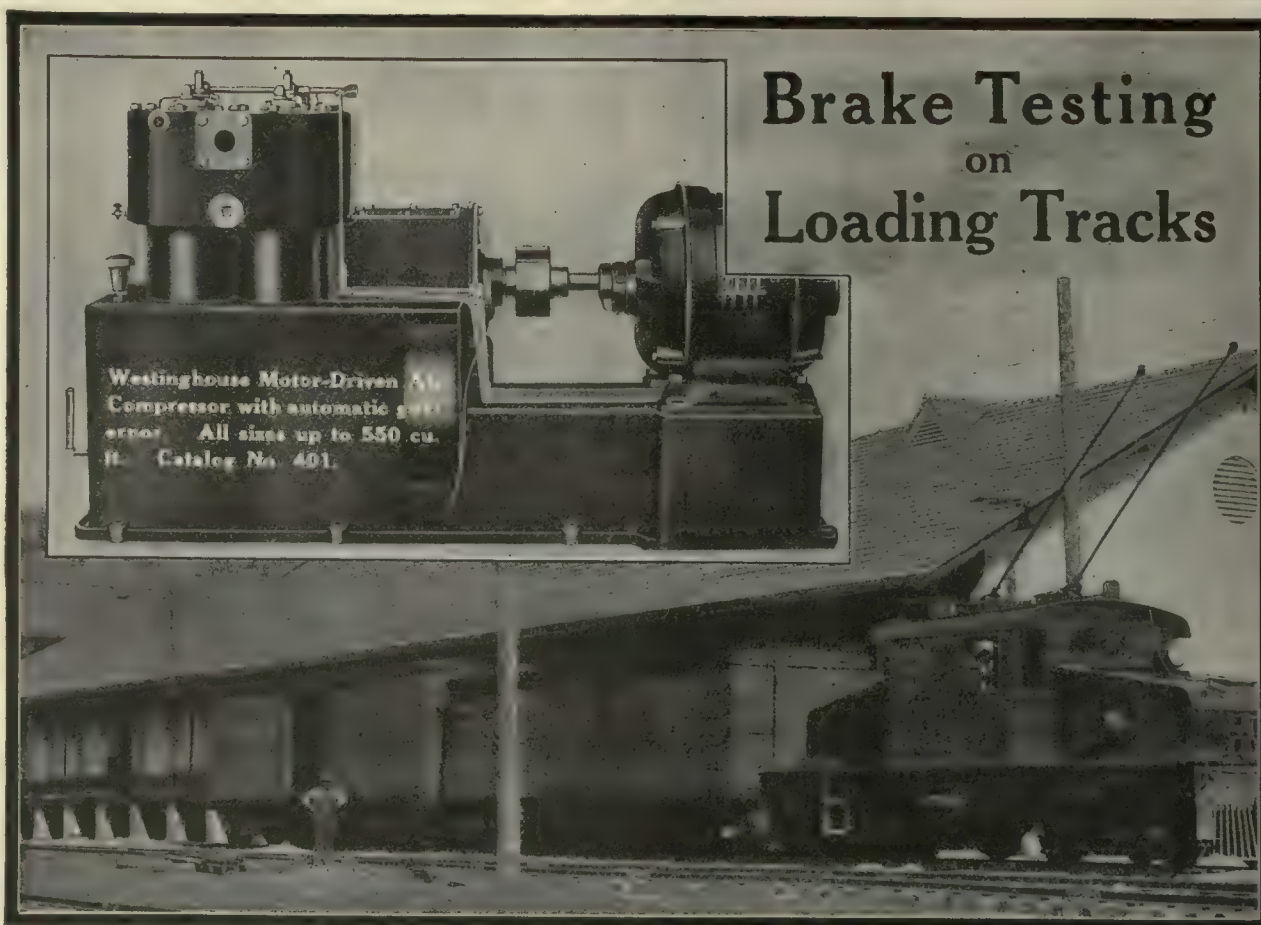
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MP Arrest-  
ers have the  
lowest equivalent  
gap, and the maxi-  
mum discharge ca-

capacity  
of any ar-  
rester for similar  
service, except the  
condenser and elec-  
trolytic types.

One or two arresters on each car give ample protection under ordinary conditions. Auxiliary protection is provided by mounting them on the line, about five to the mile. The line arresters relieve the car arresters from excessive duty, so that complete protection is more nearly assured to the car apparatus.

MP Arresters are fully described in Section I-A of the Westinghouse Annual Catalogue, 1919.

Westinghouse Electric &  
Mfg. Company  
East Pittsburgh, Pa.



# Westinghouse



# A Scientific Adaptation of Mechanical Performance to Facilitate Human Endeavor

The M-28 BRAKE VALVE of the AIR BRAKE AND SAFETY CAR CONTROL EQUIPMENT, furnished by the SAFETY CAR DEVICES COMPANY, combines all of the normal operating functions [incident to a stop in one operating handle—stops the car, opens and closes doors and steps, distributes sand and releases brakes.



Equip your new and old cars with

**AIR BRAKE AND  
SAFETY CAR  
CONTROL  
EQUIPMENT**

to secure the many advantages of Safety Car Operation.

It provides an interlocking means such that these functions shall be performed RELIABLY and UNIFORMLY

**SAFETY CAR DEVICES COMPANY**

Main Office—Boatmen's Bank Bldg., ST. LOUIS

CHICAGO  
Railway Exchange Bldg.

NEW YORK  
City Invest. Building

PITTSBURGH  
Westinghouse Building

CANADA—Canadian Westinghouse Co., Ltd., Hamilton, Ont.





# PRODUCTS

*Quality First*



## SAFETY AT A DANGEROUS PLACE

Because of high wire and rough track the trolley pole is especially apt to jump at grade crossings. There can be no more dangerous place for a car to stall.

National Trolley Guard makes grade crossing safer. If the wheel jumps National Guard catches it and furnishes power to carry the car clear of danger.

It is an inverted trough of open wire mesh. It offers practically no resistance to locomotive exhausts. Does not collect snow or ice excessively—goes up easily and stays up.

"Guarding the Grade Crossings" illustrates 22 installations and tells all about National Guard. Copy on request.



End view of  
National Guard  
installed.

*Exclusive Sales Agents for National Trolley Guard (patented).*

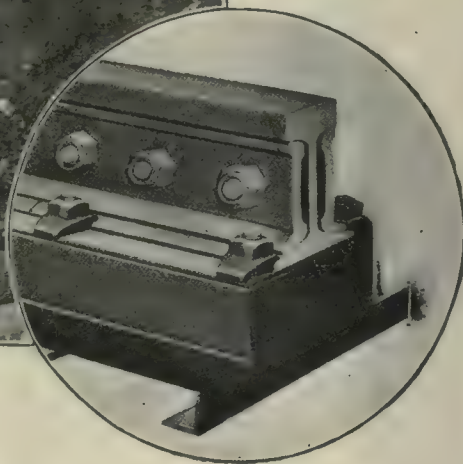
**THE OHIO BRASS COMPANY**  
Mansfield, Ohio

New York  
Chicago

Philadelphia  
Los Angeles

St. Louis  
Cleveland





**This low, uneven joint was rectified without interrupting traffic—by the**

## **DAYTON RAIL JOINT BOOSTER**

All they did was to cut out the old failure of a supporting structure, clamp and weld the Dayton Booster into place, jack up the rails and fill the hole with concrete! Simple, isn't it? Yet a "Sure Cure" (in the truest sense of that old fashioned expression) for all low joint troubles. The upper illustration gives you a good idea of the

small amount of excavation that is necessary. The lower cut shows a cross-section of this Booster. TRY some on the worst joints in your line and convince yourself that here is a vitally important source of economy that will be mighty welcome in these days of uncertainty.



*Order One for Trial and Be Convinced*

**THE DAYTON MECHANICAL TIE CO.**

201 Third Street Arcade  
DAYTON, OHIO







Note the upturned sides of the plates, instead of down. This feature insures perfect bearing on the concrete and eliminates tamping.

## INTERNATIONAL STEEL TWIN TIES

# Place their effective bearing area directly under the rail

This is where it **belongs** if you are to have adequate rail support. The bearing plates are 13 x 36 inches in size. They carry the load and effectually distribute it over a large area of the concrete. This results in two things. First—your track has a greater factor of safety. Second—your track and ties have greater life.

But the bearing plates are not the only consideration in International Steel Twin Ties. The 3-inch CHANNELS connecting these plates

play an important part in their efficiency. These channels rigidly maintain the gage, and serve to reinforce the concrete. The result of this is that you need only 7 inches of concrete—instead of the usual 12 or 14 as with wooden ties. And you need proportionately less material, less labor, excavation and time to install.

For permanent track at **least** cost—International Steel Twin Ties. Let us send all the details.

Permanent Track at Less Cost  
Any Type Base — Open or Paved Track

## The International Steel Tie Company

Manufacturers of Steel Twin Ties and Crossing Foundations

General Sales Office and Works: Cleveland, Ohio



# Phono-Electric

## 11,000 Volt Contact Wire in the Hoosac Tunnel Zone

The Hoosac Tunnel, one of New England's most important traffic links, handling about 100 trains a day, has been fitted with **Phono-Electric Trolley Wire** ever since it and its approaches were electrified.

The tunnel wire is 15 feet above the rails and the approach wire 22 feet above the rails.



The same **Phono-Electric Contact Wire** for this 11,000 volt, 25 cycle service has been in use since May 27, 1911—7.92 miles of route and 21 miles of track.

Heavy service and sudden changes in clearance are no burden on **Phono-Electric Trolley Wire** because of its toughness in composition and trueness in gage.

**Bridgeport Brass Company**  
Bridgeport Connecticut





*These People Buy Service From You—  
This Service should include Faraday Car Signal Systems*

Give them Faraday High Voltage Car Signal Systems so that they can easily signal motormen to stop. Faraday High Voltage Car Signals are dependable. Their use assures you of continued operation of signals and the elimination of batteries.

Install them in every car—*Write for literature.*



PUSH BUTTON



RESISTANCE

**ELECTRIC SERVICE SUPPLIES Co.**

*Manufacturer of Railway Material and Electrical Supplies*

PHILADELPHIA	PITTSBURGH	NEW YORK	CHICAGO
17th and Cambria Streets	335 Oliver Building	50 Church Street	Monadnock Building





## Thermit at Los Angeles

### *Welds that Hold*

This scene on South Main Street between Thirtieth Place and Slauson Avenue, (3 miles) Los Angeles, is one of several important Thermit Weld installations in that busy and beautiful city.

This particular installation was made in 116 lb. girder rail of 3 ft. 6 in. gage in 1913.

While not of the later Insert Weld type, the Thermit Welds in this work are giving excellent service as evident from the absence of trouble reports. No news in such cases is good news.

The Thermit Insert type of Weld we know will give you still better service in attaining

*A Truly Continuous Rail.*

### **METAL & THERMIT CORPORATION**

Successors to Goldschmidt Detinning Co. and the Goldschmidt Thermit Co.

**120 BROADWAY, NEW YORK**

329-333 Folsom St., San Francisco

7300 So. Chicago Ave., Chicago

Factories located at Chrome, N. J.; Wyandotte, Mich.; East Chicago, Ind.; Jersey City, N. J.

15 Emily St., Toronto, Ont.

1427-1429 Western Ave., Pittsburgh, Pa.





## Fourteen years in service —in perfect condition today

**H**ERE is convincing proof of the permanence of Armco Iron Culverts. Installed in 1905, this culvert shows no deterioration in 1919. And this is only one of thousands all over the continent which have been in service for 10, 12 and 15 years.

When you put in an Armco Iron Culvert it is *there to stay*. The Armco Triangle trademark is your guarantee of long life and satisfactory service.

*There is a manufacturer in nearly every State and in Canada, making genuine rust-resisting ARMCO IRON CULVERTS and other products of ARMCO IRON, such as flumes, siphons, tanks, road signs, roping, etc. Write for full information and nearest shipping point on products in which you are interested.*



**Armco Iron Culvert & Flume Mfrs. Assn.**

**Transportation Bldg., Chicago.**



# *To all purchasers and users of Boyer Pneumatic Hammers*



*This mark of protection*

*is your safeguard.* It is indelibly stamped upon every spare part entering into the Boyer Pneumatic Hammers.

*This mark gives assurance* that material and workmanship fulfill our rigid requirements.

*This mark protects you* against the misrepresentations of unscrupulous imitators, fraudulently offering alleged reproductions of inferior quality and questionable accuracy.

Our guarantees for the efficiency and durability of our tools are void unless the tools are maintained with parts of our own manufacture, equalling our standard of mechanical accuracy and made from material that has met our high metallurgical requirements.

Spare parts for our product should be purchased directly from this Company through its district office that provides your service.

Chicago Pneumatic Tool Company

Fisher Building

New York

Chicago

San Francisco

*Sales offices all over the world*

*"Chicago  
Pneumatic"  
Products*

*Pneumatic Tools  
Electric Tools  
Air Compressors  
Oil and Gas  
Engines  
Rock Drills  
Giant Trucks*

# **"CHICAGO PNEUMATIC"**

*Pioneers in Pneumatic Tool Progress*





## National Pneumatic Second-Saving Specialties Essential for Best Train Operation

There is no worth-while economy in surface car train operation unless the increased number of stops made and passengers carried are set off by faster handling of the passenger and prompter transmission of the starting signals. These necessary savings in time are obtained to the greatest possible degree only with

### **National Pneumatic Door and Step Control**

For the quick, positive, laborless operation of doors and steps.

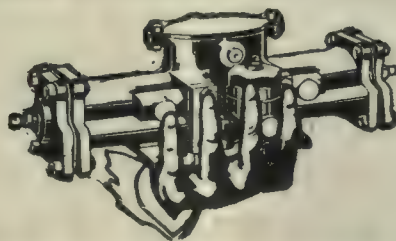
### **National Pneumatic Interlocking Safety Door Control**

For the absolute prevention of the platform accident.

### **National Pneumatic Motorman's Signal Lights**

For the immediate starting of the car after the doors are closed.

*We shall be glad to furnish full particulars at any time.*



# NATIONAL PNEUMATIC COMPANY

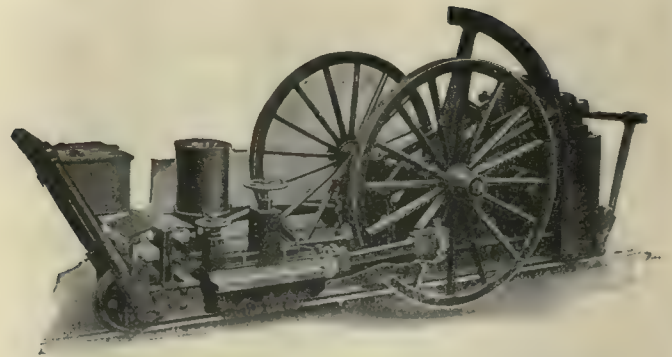
INC.

50 Church St. New York

515 Laflin St. Chicago







# **CHOOSE!**

## **The Reciprocating Track Grinder**

has clearly and completely shown its ability to greatly prolong the useful life and service of track.

The only alternative to the consistent use of a Track Grinder for eliminating corrugations and cupped joints is the relatively early replacement of track.

The great economy of track grinding as compared with the loss of years of track service makes the choice easy.

And that is to say nothing of the saving in the decrease of wear and tear on rolling stock and the general advantages which accompany smooth, well maintained track.

**RAILWAY TRACK-WORK COMPANY**

30th and Walnut Streets, Philadelphia



# Dayton, Springfield & Xenia Installs

## ECONOMY METERS

because

**They meter the ENERGY and that's what the management wants to save**

The above property has equipped all its active cars with ECONOMY Railway Meters and has found that very substantial savings in car propulsion energy are being effected. The Management, in its energy-saving campaign, is metering the energy because that's what it wants to save—and car motor energy consumption is the correct relative measure of the motorman's efficiency.



The dial of the ECONOMY Meter shows the motorman just how much energy his car consumes.

He knows that by saving energy he saves money, and few men are willfully wasteful.

Because the ECONOMY Meter measures what he is trying to save, the motorman can satisfy himself as to the most economical methods of operation.

His interest is held and he *does* save because he can see his results any time.

These fundamentals underlie the success of the ECONOMY Meter on many large and small properties.

This device on your cars will speedily pay for itself in the savings it effects.

Let us send you our illustrated booklet describing it.



"The Watchdog of Your Power"

### Economy Electric Devices Co.

L. E. Gould, Pres.

*Exclusive Sales Agent*

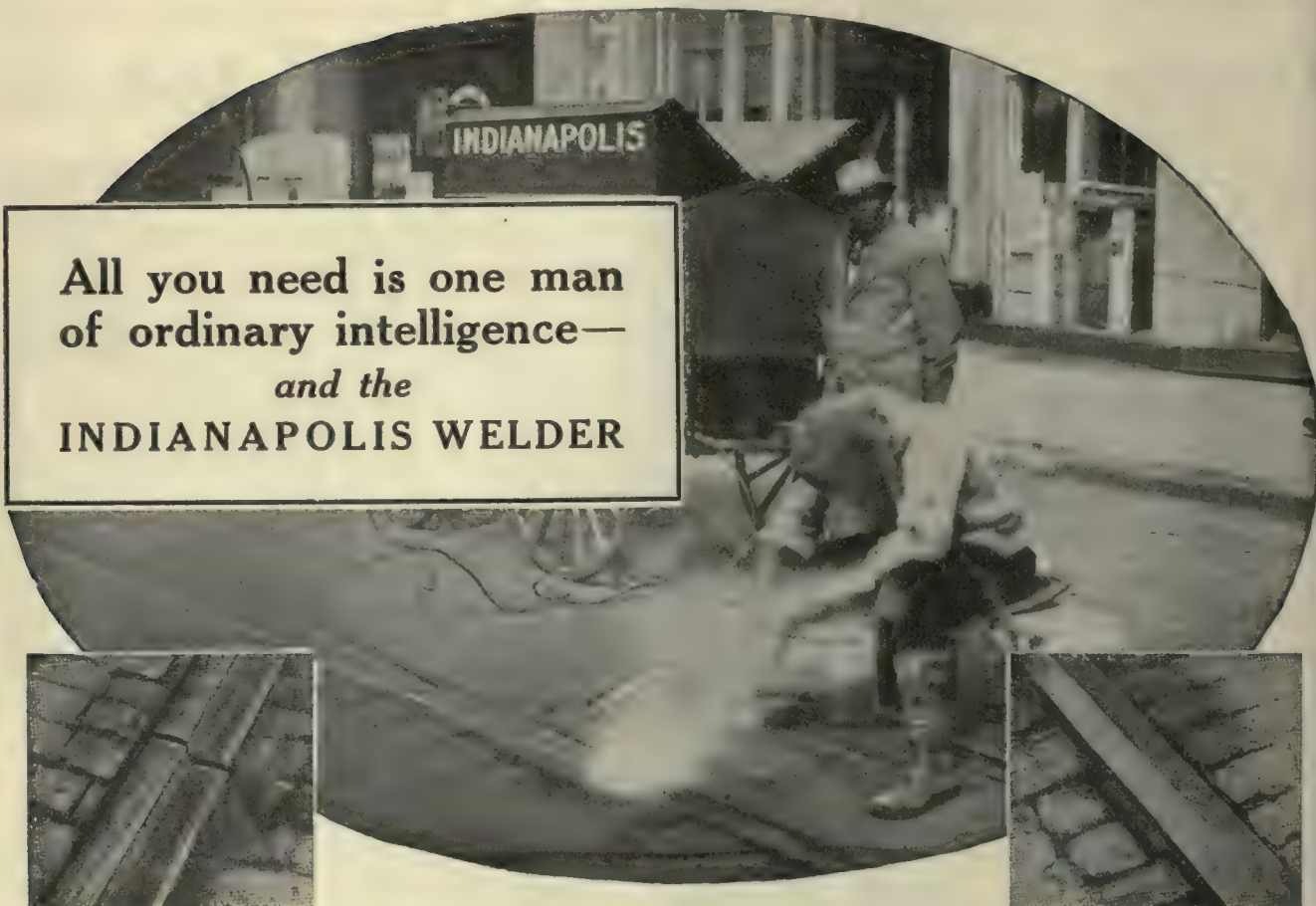
**Sangamo Economy Railway Meter**

*District Representative: Peter Smith Heater Co.*

**Old Colony Bldg., Chicago**



All you need is one man  
of ordinary intelligence—  
*and the*  
INDIANAPOLIS WELDER



BEFORE

AFTER

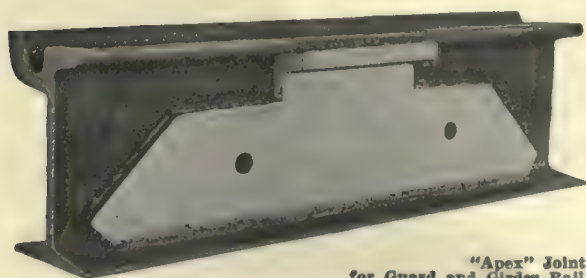
## To make old rails, broken frogs, switches or broken and worn equipment good as new

The Indianapolis Welder will build up the weak spots in old rails, making cupped rails, broken frogs, switches, cross-overs, joint plates, etc., good as when new.

Any man with ordinary intelligence can do the work with the Indianapolis Portable Electric Welder. Unskilled help can fix broken, worn or gutted track,

damaged switch tongues, frogs and switches and *broken and worn parts* of equipment.

The Indianapolis Portable Electric Welder makes electrically welded rail joints instead of bolted joints. Indianapolis Joints and Bonding Plates show greater conductivity than the rail itself. They eliminate current losses.



"Apex" Joint  
for Guard and Girder Rail

**Indianapolis  
Switch & Frog Co.  
Springfield, Ohio**



## The "Jumping-Off Place" to the Gold Fields



Kansas City was that in '49 and the early fifties because it was then the last completely equipped outpost of commerce west of the Mississippi.

To the men of that generation Kansas City was a busy center of commerce and from that day to this it has been a "starter" of many things for the greater service of the people of the Middle West.

It was one of the first cities in this country to develop and put into service the idea of a "Union" station for all the railways entering its gates.

The picture shows that early union terminal as it appeared forty years ago. Kansas City was the first community equipped with the overhead trolley system for street railways.

The impetus which rapid transit gave the city's growth was quickly appreciated and other communities throughout the country rapidly developed the same methods.

## Galena Oils *and* Galena Service

gave an impetus to the art and science of lubrication that has enabled that art to keep in step with the constantly growing and changing needs of the railway industry, and have always retained their positions in the forefront of the lubricating industry.

# Galena-Signal Oil Co.

Franklin, Pa.



# 3 NEW FEATURES IN SAFETY GOGGLE DESIGN



- ① SOLID METAL SIDE SHIELDS - *Perforated for Ventilation*
- ② UNIVERSAL BRIDGE - *Fits 95% of all Men without Adjustment*
- ③ ONE PIECE FRONT - *Protects Between the Eyes*

THE *Stocco* Safety Goggle is an ideal protection glass for all industrial purposes. It is being used with universal satisfaction by scores of steel plants, shipyards, foundries, railroads and other large industrial concerns throughout the country.

Simplicity of construction, strength and comfort are the features that distinguish the *Stocco* Safety Goggle from all other protection glasses. The front is made from a solid piece of light metal, with broad bearing surfaces on the nose. The side shields are solid metal, perforated for ventilation, and the flexible temples are easy on the ears. Also supplied with elastic headbands instead of temples, if wanted.

Lenses are made from clear optical glass specially treated for strength. Special colored lenses are furnished for welding, furnace work, etc. By means of an exclusive, ingenious construction lenses may be changed instantly by anyone without even the aid of a screw driver.

Not the least interesting part is the price—90 cents per pair with clear lenses, each goggle in a carton.

STANDARD OPTICAL COMPANY  
GENEVA NEW YORK



# Rico Coasting Recorders

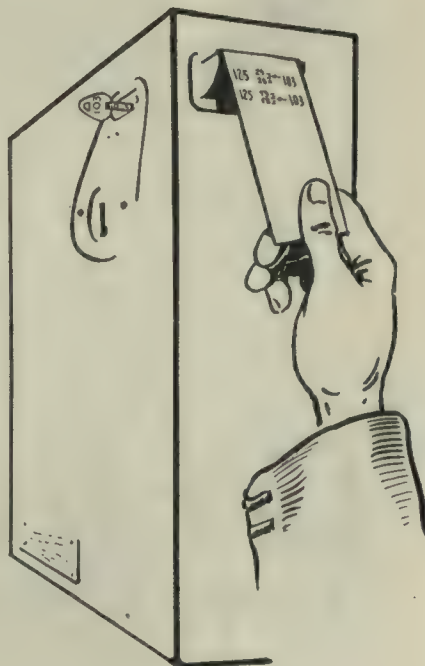
## *A Rental Proposition* (with Option to Buy)

To meet present financial conditions we have arranged to offer to supply

## Complete Equipment of RICO Coasting Records

on a nominal monthly rental basis with option to purchase.

Results obtained with thousands of RICO Coasting Recorders in actual service under all kinds of operating conditions, over a period of years demonstrate the value of this device in railway operation.



*Simple*  
*Economical*  
*Accurate*  
*Reliable*

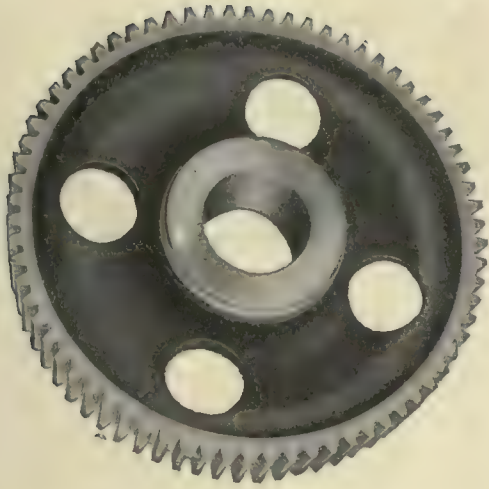
## Time is the Essence of Railroading

RAILWAY IMPROVEMENT CO.



61 BROADWAY, NEW YORK





# Grade M

The More Miles-per-Dollar Gearing

It is a literal fact that Grade M Gears *sell themselves* to those who know them. Every road that tries Grade M becomes a regular user.

Grade M economy has been amply demonstrated: More miles per dollar, reduced yearly maintenance, smaller cost per mile—any way you state it, Grade M wins.

These facts will be confirmed by any of the sixty-five electric railways that have adopted Grade M gears and pinions as standard.

40-57

**General Electric**  
 General Office  **Company** Schenectady, N.Y.

40-57



# Electric Railway Journal

Consolidation of STREET RAILWAY JOURNAL and ELECTRIC RAILWAY REVIEW

Volume 53

New York, Saturday, March 8, 1919

Number 10

## Will the Automobile Supplant the Electric Car?

RECENT figures of the registration of automobiles in the United States during 1918 discloses the notable fact that there were in that year 5,945,442 automobiles registered. This is an average of more than one automobile to every twenty inhabitants for the country as a whole. Even more noteworthy than these aggregate figures is the increase during the last few years, since the number of registrations in 1915 was only 2,423,788 or only about 40 per cent of those in 1918. This means that the annual increase of cars in active service during the past three years have been at the rate of more than 1,000,000 cars, and this in spite of the fact that for two years of that time this country was engaged in war. It is in this increase in independently driven vehicles that one reason for the falling off in traffic on the electric lines of this country must undoubtedly be found.

What significance do these figures carry to the electric railway companies? Do they mean that the electric car is becoming obsolete for city or interurban service and will soon be superseded in large part by the private or public automobile? We think not, for reasons which have already been given at length in these columns. Nevertheless, everyone should realize that people purchase automobiles to use them and that superior attractions must be offered by the electric railways to make the automobile rider patronize the electric car. In our opinion, this situation is a strong argument for frequent electric railway service with light high-speed cars.

There are several optimistic conclusions to be drawn from the large number of automobiles in this country. One is that their very number, which is constantly increasing, must hasten the adoption of regulations controlling their use, particularly in city streets. Many of the larger cities in this country now have stringent rules regarding the use of certain busy streets in the downtown districts by automobiles, forbidding the parking of automobiles in certain sections except for limited periods, etc. These rules will have to become stricter and more widespread with the increase in the number of cars, or all street traffic will be blocked. But it is fair to conclude that the right-of-way will always have to be given to the electric car, partly because of its common carrier character and partly because it is the most economical in space per passenger carried of all the users of the streets. Hence, it may soon develop that the electric car will be a more speedy as well as a more convenient carrier in city transportation for the average length of ride than even the private high-

powered limousine or sedan, and it will always be cheaper to operate per passenger than any automobile.

We are glad, in this connection, that the Transportation & Traffic Association is planning at its October convention to give special attention to two problems which are especially involved in automobile competition, namely, the use of safety cars considered from the transportation standpoint and traffic regulations designed to promote greater reliability of electric railway schedules.

## Testing Unskilled Workmen as a Means for Combating Lack of Efficiency

IN A RECENT editorial we called attention to the decrease in productive ability of unskilled workmen despite increases in wages. It was stated incidentally that many wage earners seem not to think it necessary to earn more when paid more. Now there certainly must be some point beyond which no employer can afford to go in making wage increases if production is either to stand still or, as often seems to be the case, to decrease somewhat according to an inverse ratio. Production cannot be allowed to decrease, hence employers must do something to counteract the tendency referred to. One way of doing this is to exercise more care in the selection of men, particularly for work which does not require great skill. This is a part of human engineering which in the past has not had the attention which it deserves.

The situation was clearly presented in a letter from A. G. Drury of Cincinnati, Ohio, printed in the July 13, 1918, issue of this paper. Mr. Drury carefully rated the production of laborers digging a standard-size gas trench under similar soil conditions and over a period of four years, or from 1914 to 1917 inclusive. He found that the effectiveness of the men decreased 23 per cent during that period, with a sharp decrease of 11 per cent between 1916 and 1917. Wages were increased 20 per cent during that period, the last year of which was, of course, our first year of war. The important point to be noted here is that the men were probably not so strong or able bodied in 1917 as in 1914, due, of course, to the fact that the more able-bodied and younger men were going to the front or were seeking jobs in munitions and other war work. The men secured in their places simply could not keep up the pace required to maintain satisfactory production.

The above facts should lead to the study of the economy which would result if some physical tests were required of laborers, say to cover stature, alertness and



other desirable characteristics. Perhaps the railways may yet find that they should test laborers just as they now test trainmen, motormen and employees of other classes. In other words, the laborer should be selected for his capacity to do work intelligently rather than just because seemingly he can wield a pick and shovel. The joke about the wheelbarrow being a piece of machinery always provokes a laugh, but it requires a sturdy man to handle a loaded wheelbarrow all day long, and it is far from economical to expect undersized old men and mere boys to do men's work of this kind. Such false economy should be abandoned, and the needed steps should be taken to secure able-bodied efficiency in doing ordinary work about the electric railway.

### Skilled Labor Must Be Selected Carefully Also

WHAT is true in the case of the unskilled laborer applies to the mechanic or other skilled workman whose productive ability has fallen off also in spite of large wage increases. Electric railways of fair size require skilled employees in many lines of work, and under prevailing conditions it has been difficult to secure them. The railways have not been able to offer the highest wages for skilled employment although this handicap is partly offset by the steady character of the work.

In order to get good work done, some tests should be applied to men who claim to possess skill to determine their fitness for the specific lines which they desire to enter. This accomplished, the next step is to make it apparent that lack of training for their work will not only prevent employment at first-rate wages but will hinder advancement. Men who are taken on as helpers or in other grades of work lower than that of first-class workmen must understand that to receive good wages they must develop their ability to advance to higher grades. To some degree the training needed for advancement must be provided by the employer and this to an extent much larger than has been the rule. It will probably even be necessary to pay the men while training, just as motormen and conductors are now paid as "students."

P. T. Clayton, clerk of the House committee on labor of the Sixty-fourth Congress, states that six reasons for inefficiency in production are these: Power failures, equipment and repair failures and limitations, lack of instructions, lack of training, failure to supply materials and lack of an effective personnel. Of these the employer can or should control the first, second, third and fifth. He must begin to supply the fourth. The sixth element has been found to be negligible as compared with the others in an examination of a plant which has a very high reputation for efficiency. Here it was found that the men produced but 35 per cent of what they could readily have produced but for the impedance caused by the factors mentioned. The output usually consisted of three hours' value for nine hours' work.

If the foregoing case is typical, it shows that there is a great opportunity for bringing up production. Aside from the investigation of the needs for improvement in plant, power and material supply, the employer

must take steps to see that proper superintendence and instructions are provided. Above all the selection and training of employees must be made the subject of special study.

### There's a Fine Chance Now for Good Engineering

ONE of the partial compensations for the destruction of property caused by the war has been the realization that preventable wastes which had been going on for years would have to be reduced. And they have been reduced, or it would not have been possible to do what has been done lately in the electric railway and other fields. Any person who has a practicable plan for accomplishing any saving now is sure of a hearing, as was illustrated by the way in which the Central Electric Railway Association listened to and discussed a paper by G. H. Kelsay on "Power House Economies," at the Cleveland meeting last week. The speaker cited so many instances in which savings, large and small, could be made that one member in discussing the paper said humorously that if they could all be put in force power could be obtained for almost nothing. Mr. Kelsay covered ground which has been familiar to engineers for a long time, but it has not always been possible heretofore for them to obtain the savings that their better judgment told them ought to be had. Furthermore, he showed clearly that a few simple instruments will furnish the equipment necessary for intelligent operation of a power plant, given which it is necessary only to apply sufficient brain power and a reasonable amount of money to insure good results.

It is very apparent, when one considers the ways in which power plant savings are to be made, that real engineers are needed in the power department. Such men are not found in large numbers on electric railway properties for several reasons. They and their work have been considered in many instances an unnecessary refinement as long as the "practical" men could keep the plants going. Hence the compensation offered, if offered at all, has not been attractive compared with the possible earnings in construction, engineering sales work, manufacturing and the like. In fact, the manufacturers have been far ahead of the operators in their appreciation of engineering talent and training. Another thing is that the engineer has often felt himself circumscribed as to opportunity for advancement to executive positions. Such opportunity, even if advantage is not taken of it, is one of the greatest possible incentives to initiative and enterprise. After all, an ambitious, rising man is the only kind that is worth while in any position of potential importance.

Now a man of the rising type is not expensive, at any reasonable salary, if he can bring about the savings which Mr. Kelsay has listed. After he secures these he will look around and find "more worlds to conquer." This is a fine time to give the engineer a chance to show what he can do. He ought to make an excellent showing, particularly in view of the facts that fuel is high in price and poor in quality and that it will probably never reach the price level which prevailed during the pre-war period.



**Keep the Tracks Clear  
from Vehicles as Well as Snow**

**WE** HAVE already referred to the intention of the Transportation & Traffic Association to appoint a committee to report at the October convention on the subject of a code of principles designed to promote reliability of railway schedules. No subject in the transportation field demands more prompt and thorough attention by a committee than this. While a code of principles in itself will not clear the tracks of obstructions, we have no doubt that discussion of this very important topic will lead to effective education of the public and the authorities who have to do with highway regulation.

Unusually favorable weather conditions in the past few months have been a Godsend to the suffering street railway companies and undoubtedly have been the means through which some companies have kept out of receivers' hands. In fact, it is only by contrast with the storm blockades of last winter that a proper realization can be had of the beneficial effects of a clear right-of-way. In a lesser degree the helpful results from efficient traffic regulation in all kinds of weather are shown in such cities as Cleveland, where the people have been so insistent on keeping down the cost of service that they have learned to appreciate the value of unimpeded movement of the street cars.

In a very elaborate report made a few years ago by the Chicago Traction & Subway Commission there was presented a classification for one year of reported delays of more than five minutes' duration on the surface lines of that city. This showed a total of 9104 delays, amounting to 126,143 minutes, which included only cases reported to the switchboard calling for wreck-wagon assistance or other company supervision, and not referring to the much larger number of minor delays which were cleared up without such help. Analysis of these reported delays showed that in more than 50 per cent of the cases the company was not responsible. The conclusion of the commission was that "this subject is a matter purely for police regulation, but it is pointed out as an important item in the securing of satisfactory service to the traveling public. Delays of ten or fifteen minutes, particularly on long routes, such as the through routes used in this city, necessarily break up the uniform interval that should obtain between cars of the same route."

Avoidable interruptions to service are common on all large city railway properties. Cars are sent out from the depots on time, and their operators earnestly endeavor to maintain a schedule laid out to cover each and every run. Every day they run into unforeseen delays such as blockades at railroad crossings, tie-ups due to wagons and other vehicles breaking down on the tracks, wires down, fire hose across the tracks, etc. The result to the company is more costly operation for non-productive car-hours and the loss of traffic which could be retained if the cars moved on time. The effect on car patrons is irritability of temper and the loss of many valuable hours.

Delay-proof schedules are, of course, not to be expected, but proper co-operation on the part of the authorities and the general public is bound to minimize to a great extent interruptions to service. During the past year there has been much discussion of cost-of-service, and we believe the time is ripe when the car patrons should have brought home to them a full under-

standing of the items which make it necessary to request a higher transportation charge. We hope a workable code of principles may be developed speedily through the T. & T. Association and that its results will be beneficial.

**Electric Railways Should Not Be  
Asked to Subsidize Their Competitors**

**"OF ALL THE CRIMES** ever committed against the car rider, that is the crime of crimes, making him pay for another man's pavement. There is one thing the Legislature of this State should do this winter, it should repeal every act that commands a transportation company to put down one paving stone in any street or road in the State of Massachusetts." This is the forceful way in which Peter Witt stated the case of public burdens borne by railway companies, in a recent address before the New England Street Railway Club. In equally strong language Mr. Witt condemned the practice of requiring these companies to sprinkle their right-of-way.

The subject of making the car rider pay for non-transportation charges is one which will not down. For years the transportation companies—which in the final analysis means the passengers—carried such burdens without complaint. Originally, of course, there was justice in such requirements because in the horse-car days the companies were responsible for stirring up dust as well as for wearing out the pavement between the rails. With the advent of cable and electric cars, however, this was no longer the case, but the companies were making money and there was no special reason for seeking to lift unwarranted charges from the nickel fare. Then came the time for resorting to every possible economy, and public service commissions began to see the unfairness of this old practice. The necessity for a change was especially evident where service was being provided at cost.

There is more and more talk of laying general taxes to aid the car rider. This subject was emphasized in a recent recommendation of the Massachusetts commission to the State Legislature, wherein it was proposed that the deficit arising from operation with a not unduly high fare should be met by a tax levy. This is an indication of a growing understanding of the fact that adequate transportation facilities are a necessity not only to the regular passengers but to the community as a whole. This is a theory which we believe will find more supporters as time goes on. Likewise, we look for a more general adoption of the policy established by Mr. Witt in Cleveland of having adjacent property owners pay for street railway extensions until the new lines are on a self-supporting basis. There is surely more equity in such a practice than in the provisions of the Chicago ordinance which require the building of some 20 miles of new extensions each year regardless of traffic demands and with no direct financial assistance from the property owners who are benefited.

State commissions and municipalities should give careful consideration to these suggestions. No one will accuse the authorities of being over-zealous to grant higher rates to public utilities, and they will find less necessity for advancing rates if all unwarranted burdens are first removed from the cost of transportation.



# The Zone Fare in Practice—Glasgow

By WALTER JACKSON

This Section Describes the Layout of the Tramway System, the Service on Different Lines as Regards Speed and Headways and the Application of the Zone or Graded Fare—How the Combination of Service and Zone Fares Has Produced the Extraordinary Traffic of Nearly Twenty Passengers per Car-Mile Due to the Great Proportion of Short-Haul Riders

## PART TWO

### *Extent of System; Character of Service and Riding; Fares*

FEW electric railway systems, private or municipal, can show such an excellent financial and operating record as the Glasgow Corporation Tramways. Indeed, the Glasgow system was well known in the United States more than a decade ago when James Dalrymple, then and now its general manager, was invited to help solve the Chicago traction situation during the term of Mayor Dunne. Therefore, the operating standards of Glasgow have long been considered as embodying the best principles that British tramway practices have to offer. In some respects, especially car equipment, we may have little to learn; but in such basic matters as frequency of service and fares that almost eliminate walking, there may be much from which we can benefit.

#### HISTORY AND GROWTH OF THE TRAMWAYS

Glasgow's first tramway line was constructed by the municipality and opened for traffic on Aug. 19, 1872. In 1871 the city had leased the privilege of operating any tramways to be constructed to the Glasgow Tramway & Omnibus Company for a period of twenty-three years, or to 1894. Five years before the expiration of this lease negotiations were opened for its renewal. However, the elections of 1890 and 1891 showed so strong a sentiment for complete municipal control that the municipality resolved on Nov. 12, 1891, under the power conferred by the tramways act of 1870, to undertake the operation of the tramways itself. The municipality offered to take over, at a valuation, as a going concern, the whole of the company's heritable property, horses, plant and general equipment on the termination of the lease. This offer was not entertained, and the city had to build depots and obtain the necessary staff and equipment before July 1, 1894.

The first electrified line was opened on Oct. 13, 1898, and the last horse car had disappeared by the end of April, 1902. Aside from the expenditures directly due to electrification, such as power house and substations, distributing system and rolling stock, the municipality has continually been raising its track standards to keep pace with its heavy traffic. For this reason, the 79-lb. girder rail of the 1894 period has been succeeded by heavier rails until the attainment of the present standard—a 110-lb. rail laid in 60-ft. lengths, 4-ft. 7½-in. gage, on a bed of Portland cement concrete 6 in. deep and extending 18 in. beyond the outer rails.

By the time the Glasgow Corporation Tramways had electrified its lines, it had written off the complete investment in horse traction, and the fiscal year ending May 31, 1917, saw the conclusion of payments to sinking fund and interest on capital for the electrical investment. For this reason, the report for the fiscal year ending May 31, 1918, shows only the following non-operating accounts: depreciation, permanent way renewals, parliamentary expenses, income tax and proportion of traffic receipts due the Paisley District Tramways Company, Ltd. It is largely because of this wonderful record that the Glasgow system has not found it necessary to raise the rates of fare during the war and reconstruction eras, and, in fact, even paid over to the general municipal fund termed the Common Good the sum of £177,552!

When the city took over the lease, Glasgow had only 60 miles of single track. Now it has 196 miles and as soon as materials are obtainable it is prepared to add 42½ miles, making 238 miles of single track in all. Of the total length of the tramways made and authorized, about 25 per cent is outside the present enlarged city limits, extending into the burghs of Clydebank, Renfrew, Paisley and Rutherglen, and into the counties of Lenark and Renfrew. The city forms practically one community with most of these places, and it has consequently been glad to accord them the same facilities as to the citizens of Glasgow. The layout of the existing electric railways is shown in an accompanying map. This map also shows the routing of the steam and cable belt lines described later.

#### THROUGH ROUTING AND TURNBACK PRACTICES

Practically all routes are double-track, run through from one end of the system to the other, and are amply provided with cross-overs, both at the terminals and along the routes, to insure the utmost flexibility of service. Because of the cultivation of the short rider, even in the outer districts, the turning back of non-tripper cars is not extensively employed except at or near the city limits where there may be a sharp falling-off in traffic. For example, the Paisley-Uddingston line, which is 14½ miles long, has a two-minute service on the 4½-mile section between Tollcross and Ibrox; a six-minute service between Ibrox and Paisley and an eight-minute service between Tollcross and Uddingston. In



such instances the only complaint comes from terminus riders who find that they cannot board through cars sometimes because the latter may be crowded with short-haul riders. The through rider is less inclined than Americans to board a short-line car and then get on a following through car at the city line because this means a second fare transaction instead of the presentation of a transfer ticket.

To carry 430,946,566 passengers during the last fiscal year, the Tramways operated 26,261,231 car-miles with 861 cars, leading to the high average of 16.41 passengers per car-mile. This density, because of growth of traffic and war shortage of cars, reached the extraordinary figure of 20.33 passengers per car-mile for the week ended Dec. 14, 1918. Actually the number of cars in use is 750 on weekdays, 800 on Saturdays, 560 on

hundred feet of each other. Every car carries on the inside bulkhead a schedule of the fares between all the stages on the route.

The spacing of the fare boundaries is not affected by the density of travel in given sections. Such variations as occur are due to the desire to place the fare boundary at the natural traffic-gathering points along each route. These boundaries are indicated by enameled signs carried on the trolley poles, if convenient, or on metal standards as illustrated on page 452.

The maximum fare to-day is 4 pence, as shown by the reproduction of the eight denominations of fare tickets used at Glasgow. The detail of the conductor's and auditor's duties in connection with the accounting of zone fares will be presented later. It will suffice to state here that the regular passenger simply calls for a



LOCAL TRANSPORTATION LINES OF GLASGOW DISTRICT, SHOWING MUNICIPAL AND OTHER TRAMWAY LINES, STEAM SUBURBAN BELT LINE AND UNDERGROUND CABLE BELT LINE

summer Sundays and 500 on winter Sundays. As many as ninety-six cars were off the schedule at one time.

The present rates of fare, whereby the half-penny (1 cent) stage was lengthened from about  $\frac{1}{4}$  mile to an average of 1.16 miles, were instituted in December, 1911. This is also the minimum fare for children between the ages of five and fifteen years, although half-fare is permissible otherwise. Up to 1902, workmen got a three half-pence (3 cents) ride for 1 penny before 7 a.m. and between 5 and 6:30 p.m. With so low a base fare as a half-penny, the complexity of such discriminatory fares, of transfers and of overlaps is eliminated. With a distance charge in vogue, the transfer is unnecessary as it makes no difference whether the passenger is going to continue in the same general direction, to the right or to the left. He simply pays for what he gets. As for overlaps, there are only two in all Glasgow. These occur at a junction where the boundaries of several routes happen to come within a few

hundred feet of each other. Every car carries on the inside bulkhead a schedule of the fares between all the stages on the route. In each case, the passenger on paying fare receives a fare receipt for the same amount. This receipt is torn off of a nailed pad. The conductor then inserts the ticket in a bell punch and counter in order to perforate the section of the ticket which shows the limit to which the passenger is entitled to ride. Fares are collected only within the car. In fact, the conductors are instructed not to impede speed of entrance and exit by collecting fares on the platform.

While no figures on the rate of passenger interchange are available, it is obvious to the observer that it must be very quick as two persons can readily board or leave the car at the same time by way of the rear platform, which is the only one available for the passengers. As the average step height is about 12 in., it is not uncommon to see women with babes in arms jumping on and off moving cars. Needless to say, this practice is not







TABLE II—NUMBER OF AND REVENUE FROM EACH CLASS OF PASSENGERS, YEAR ENDED MAY 31, 1918

Fare	Passengers Number	Carried Per Cent	Traffic Receipts	
			Amount	Per Cent
1d. ....	272,902,138	63.33	\$568,546	40.49
1d. ....	110,608,645	25.67	460,869	32.82
1d. ....	28,462,112	6.60	177,888	12.67
2d. ....	9,332,956	2.16	77,774	5.54
2d. ....	4,351,666	1.01	45,329	3.23
3d. and upward	5,289,049	1.23	73,301	5.22
Sundries*			400	0.03

On trips taken in the industrial sections during the noon hours, a conspicuously large proportion of the riders were grime-covered workmen who were traveling to and from lunch as a matter of course. Later in the afternoon, the travelers were women shoppers and school

e women shoppers and school children. Again and again, one was struck by the contrast between empty sidewalks and loaded cars which were running on a two- to three-minute headway. Those who have noted the wonderful increase of traffic produced in stagnant American communities through the inauguration of additional

FORM OF REPORT MADE BY TICKET (FARE RECEIPT)  
INSPECTOR

service with one-man automatic cars will agree that the extremely short headways prevalent in Glasgow are entitled to some credit for the heavy travel. Thus a person who starts to walk along the first outbound zone along Jamaica Street will be passed by cars at the rate of 145 an hour and even in the second fare zone outward bound he will be passed by cars at the rate of one or more every minute. Almost anywhere within a mile of the center of the city, there is at least one car every minute. Under such circumstances, who will be hard-fisted enough to walk? As shown in the Table III, two-, three- and four-minute headways on individual lines

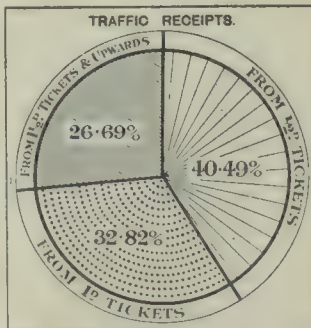
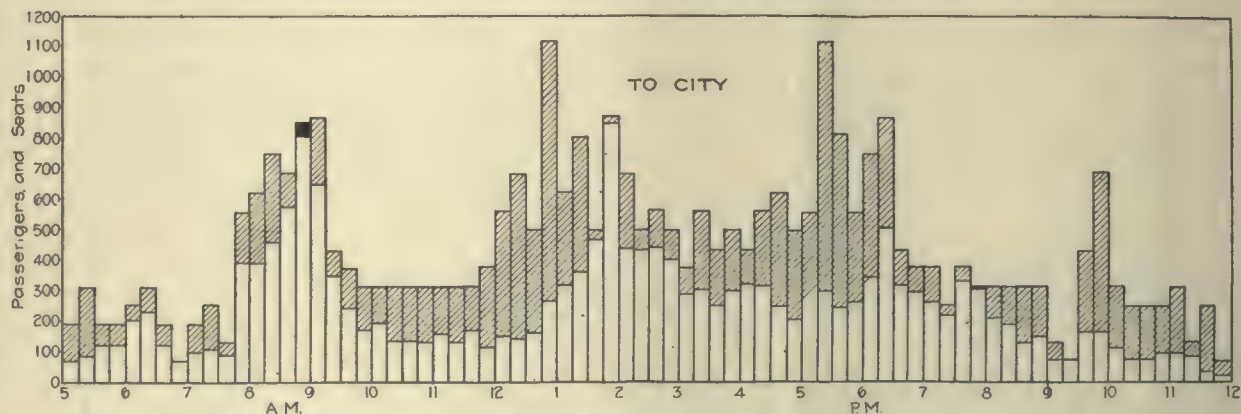
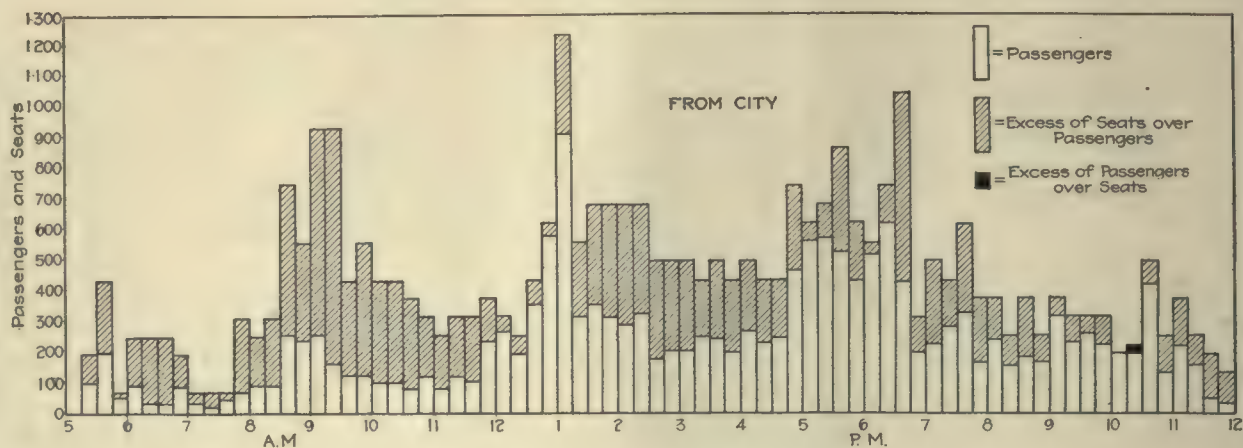


Fig. 2

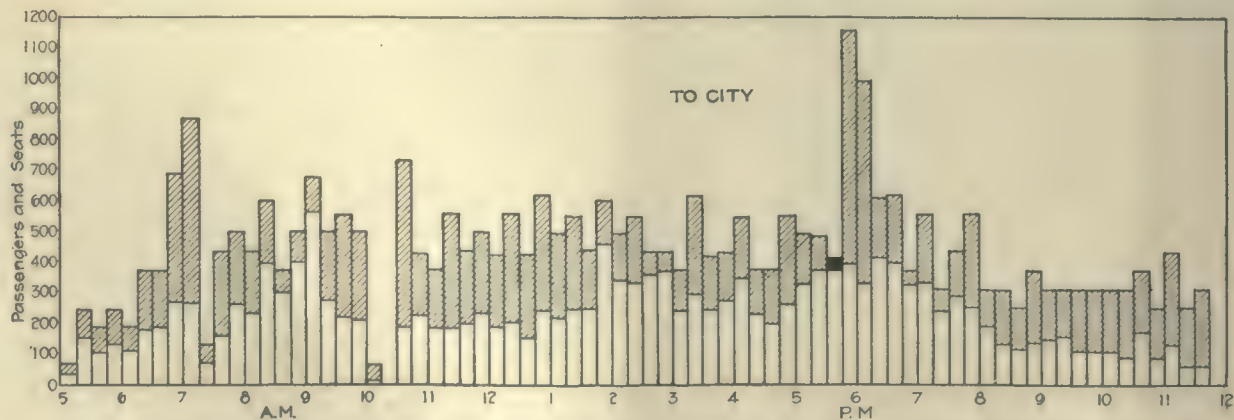
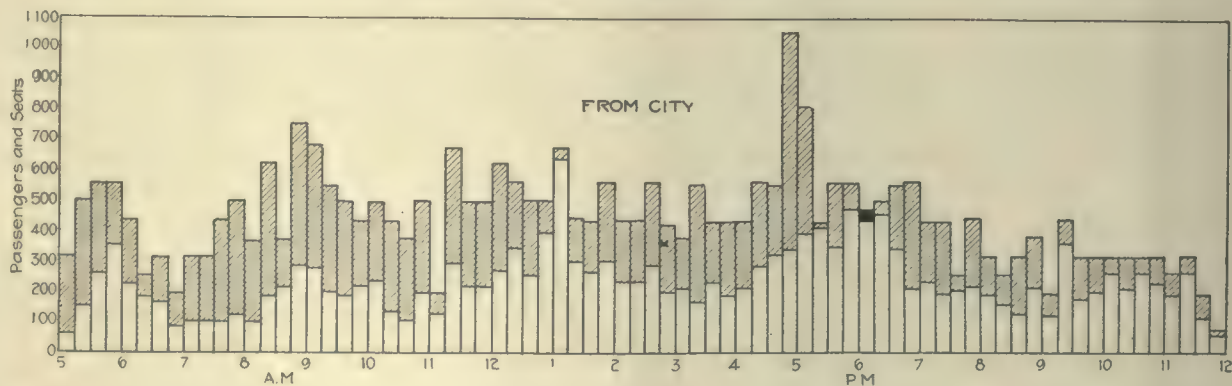
clerks, overlapping with the Langside line for a two-minute combined service for 4 miles; Dalmuir-London Road and Dalmuir-Rutherglen, serves the principal industrial plants along the Clyde and adjacent thereto.

No more striking examples of the effect of short-haul riding on the amount and variation in traffic throughout the day could be furnished than the accompanying four graphs, which are from a series prepared by the Glasgow Corporation Tramways in January, 1917,





CENSUS OF PASSENGERS CARRIED AND SEATING ACCOMMODATIONS TAKEN DURING FIFTEEN-MINUTE PERIODS ON DUKE STREET EAST OF HIGH STREET, THURSDAY, JAN. 11, 1917.  
FOR HOURLY FIGURES SEE TABLE IV



CENSUS OF PASSENGERS CARRIED AND SEATING ACCOMMODATIONS TAKEN DURING FIFTEEN-MINUTE PERIODS TAKEN ON ARGYLE STREET, WEST OF ANDERSTON CROSS, TUESDAY, JAN. 16, 1917.  
FOR HOURLY FIGURES SEE TABLE V



to determine the relation between seats furnished and passengers carried. The corresponding tables are Tables IV and V. At the time mentioned (January, 1917) the increase of traffic without new cars shows a less favorable relation of seats to passengers, but the service is still being carried out according to the rule of twenty-four passengers on the lower deck with six standees permissible and thirty-eight passengers on the upper deck with no standees. Usually, when capacity has been reached, the conductor lowers a "Full" sign from the hood and directly over the step. Only at the discretion of the traffic officer on special occasions, like blockades, in the standee rule broadened.

Referring now to the first two graphs, with corresponding Table IV, it will be noted that they show the inbound and outbound traffic respectively on Thursday, Jan. 11, 1917, at Duke Street, east of High Street, a point 1 mile from Jamaica Street, which is the traffic center of Glasgow. The cars charted on these records serve a clerical and working-class section. The reader will at once note the startling difference from daily load records of large American cities. The first point to attract attention is the midway travel which outbound reaches its maximum at 1 p.m. and inbound at 2 p.m. The workers of Glasgow have every encouragement to ride home for lunch when for 1 penny they can ride out for 2 miles without waiting more than a minute or two for a car. Luncheon hours are fairly well staggered. Like some private employers the Glasgow municipality encourages home eating by granting a one and one-half-hour luncheon period. It believes that this makes for greater efficiency than obliging its women employees, in particular, to depend upon restaurants. Glasgow office hours are generally 9 a.m. to 5 p.m. daily and to 1 o'clock on Saturdays. Shopkeepers have their half-holiday on Tuesday afternoons.

Further checking of the afternoon hours of both the inbound and outbound graphs shows an excellent traffic due almost entirely to women shoppers, school children, agents, commercial travelers, etc. Because of the continuance of short-headway service, the evening peak outbound is nowhere nearly as severe as where the let-down of midway service imposes much of this miscellaneous travel on the rush hours.

The second pair of graphs and corresponding Table V were derived from data taken at Argyle Street west of Anderston Cross and 1/2 miles from Jamaica Street. These graphs cover working-class travel almost entirely.

TABLE III—WEEKDAY ROUTES AND SERVICES, GLASGOW CORPORATION TRAMWAYS

Route	Service in Minutes					
Botanic Gardens and Oatlands..	5.18	7.29	4	5	4	5
Dumbreck and University.....	4.99	7.48	6	6	6	6
Netherlee and Kirklee }.....	7.74	8.15	2	3	2	3
Langside and Hyndland }						
Alexandra Park and Hyndland.....	4.57	8.06	8	8	8	8
Rouken Glen and Bishopbriggs..	12.15	8.35	2	3	2	3
Paisley Road and Alexandra Park	4.89	7.72	6	8	6	6
Uddingston and Paisley.....	14.74	8.98	2	3	2	3
Renfrew and Lambhill.....	9.19	8.39	3	3	3	4
Cambusland and Anniesland....	8.91	8.16	6	6	6	6
Dalmuir and Rutherglen }.....	12.42	8.87	2	2	2	3
Dalmuir and London Road }						
Burnside and Springburn.....	8.96	8.40	4	4	4	6
Anniesland and Dennistoun....	7.25	8.21	2	3	2	3
Newlands and Maryhill.....	6.06	7.45	6	6	6	6
Sinclair Drive and Kelvininside Avenue.....	4.88	7.51	6	8	6	8
Mount Florida and Killermont...	6.73	7.74	4	6	4	6
Springburn and Mount Florida..	5.80	8.19	4	6	4	6
Garnagad and Polmadie.....	3.27	7.85	12	12	12	12
Whiteinch and Keppochhill Road	5.21	8.77	7 1/2	7 1/2	7 1/2	7 1/2
Mount Florida and Paisley Road						
Toll.....	2.56	8.08	6	6	6	6
Finnieston and Stobcross Ferry...	0.45	6.75	10	10	10	...

The characteristic feature of the inbound travel on this service is the breakfast riding. Many laborers who start work early in the morning will go home a few hours later for breakfast if not too far from their work—another example of traffic promotion through zone fares and short headways like two and one-half and three minutes. It is not difficult to see why the Glasgow Tramways find it easier than American street railways to lay out a fifty-one-fifty-four hour week for platform employees!

STOP SPACING AND SPEED RESTRICTION

Obviously a street railway that wishes to relegate the walking habit among the lost arts must seek the happy medium between too many stops and too few. The peace-time standard averages 600 ft., or between eight and nine per mile, with some spacings as high as 900 ft. to permit less than 600 ft. spacing of traffic-gathering points. To economize coal, 200 out of 1840 single stops were temporarily discontinued except on the extremely busy Paisley Road-Alexander Park belt line where short-ride traffic is so heavy that conductors sell 1400 or more half-penny tickets a day. The saving in coal has not been of any great importance, partly because most of the stops eliminated were not frequently made at any time and partly because the fluctuations in a large power plant are not materially affected by the elimination of a small percentage of stops. Most stops are near side.

"Stop" signs of the style illustrated on page 452

TABLE IV—CHECK TAKEN OF TRAFFIC AT DUKE STREET EAST OF HIGH STREET

Period	From City			To City		
	Cars	Passen-	Seats	Cars	Passen-	Seats
5 a.m. to 6 a.m.....	11	353	682	14	392	804
6 a.m. to 7 a.m.....	15	246	930	13	629	804
7 a.m. to 8 a.m.....	8	151	496	18	671	1,116
8 a.m. to 9 a.m.....	30	662	1,860	46	2,277	2,852
9 a.m. to 10 a.m.....	46	670	2,852	32	1,408	1,984
10 a.m. to 11 a.m.....	25	404	1,550	20	583	1,240
11 a.m. to 12 noon.....	20	528	1,240	21	572	1,302
12 noon to 1 p.m.....	26	1,377	1,612	46	706	2,852
1 p.m. to 2 p.m.....	51	1,891	3,162	45	1,985	2,790
2 p.m. to 3 p.m.....	38	995	2,356	36	1,706	2,232
3 p.m. to 4 p.m.....	30	898	1,860	30	1,143	1,860
4 p.m. to 5 p.m.....	34	1,200	2,108	34	1,080	2,108
5 p.m. to 6 p.m.....	45	2,095	2,790	49	961	3,038
6 p.m. to 7 p.m.....	43	1,768	2,666	39	1,463	2,418
7 p.m. to 8 p.m.....	31	1,011	1,922	21	1,118	1,300
8 p.m. to 9 p.m.....	20	742	1,240	20	679	1,242
9 p.m. to 10 p.m.....	21	1,043	1,302	21	470	1,302
10 p.m. to 11 p.m.....	18	968	1,116	17	351	1,054
11 p.m. to 12 midnight.....	15	441	930	12	211	744
Total.....	527	17,443	32,674	534	18,405	13,108

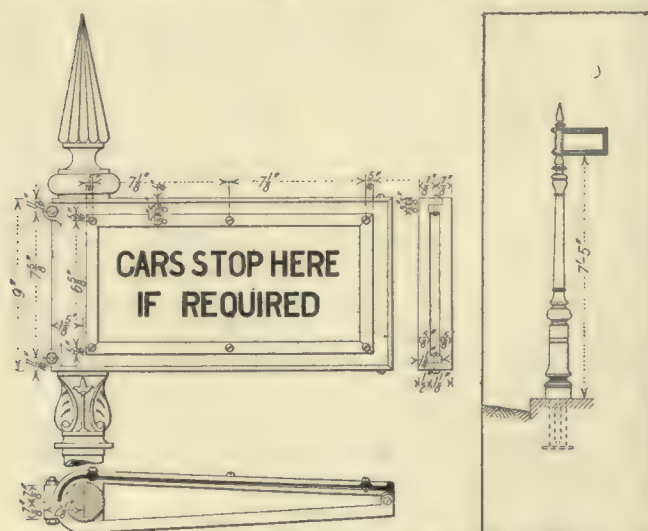
TABLE V—CHECK TAKEN OF TRAFFIC AT ARGYLE STREET, WEST OF ANDERSTON CROSS

Period	From City			To City		
	Cars	Passen-	Seats	Cars	Passen-	Seats
5 a.m. to 6 a.m.....	31	819	1,922	12	412	744
6 a.m. to 7 a.m.....	19	654	1,178	26	736	1,612
7 a.m. to 8 a.m.....	25	415	1,550	31	745	1,922
8 a.m. to 9 a.m.....	34	770	2,110	31	1,322	1,910
9 a.m. to 10 a.m.....	35	863	2,158	36	1,262	2,224
10 a.m. to 11 a.m.....	29	666	1,790	33	416	1,220
11 a.m. to 12 noon.....	30	841	1,840	30	791	1,866
12 noon to 1 p.m.....	35	1,253	2,170	33	778	2,020
1 p.m. to 2 p.m.....	34	1,491	2,088	34	1,186	2,096
2 p.m. to 3 p.m.....	30	947	1,848	31	1,408	1,914
3 p.m. to 4 p.m.....	29	794	1,790	30	1,056	1,848
4 p.m. to 5 p.m.....	42	1,147	2,592	30	1,040	1,852
5 p.m. to 6 p.m.....	38	1,607	2,348	41	1,528	2,518
6 p.m. to 7 p.m.....	33	1,453	2,034	42	1,477	2,592
7 p.m. to 8 p.m.....	25	835	1,550	30	1,118	1,860
8 p.m. to 9 p.m.....	20	669	1,240	20	580	1,240
9 p.m. to 10 p.m.....	20	840	1,240	20	522	1,240
10 p.m. to 11 p.m.....	20	940	1,240	20	448	1,240
11 p.m. to 12 midnight.....	13	600	806	16	252	992
Total.....	542	17,604	33,484	533	17,077	32,910



are carried from trolley poles or standards. Stops are regularly made at the zone boundaries, at track intersections and dangerous curves. Near schools it is customary to put up "Drive slowly" signs.

The Glasgow municipality's traffic rules are few and simple. As regards the relation of cars and other vehicles, rule 9 states that the usual plan of keeping to the right in passing another vehicle does not apply when the vehicle is following a street car. In that case, the vehicle desirous of passing the car must go by on the



DETAILS OF STOP AND FARE-STAGE SIGNS CARRIED ON EITHER TROLLEY POLES OR STANDARDS AS CONVENIENT

left except where there is sufficient reason for deviation. Rule 10 states that when a tramway car is standing at a stopping place, every driver of a vehicle who intends to pass on the left or near side of the car shall draw up immediately before arriving at the stopping place until the roadway is clear of passengers entering or leaving such car. It will be understood, of course, that in Great Britain, the standard traffic rule is to keep to the left instead of the right.

In Glasgow there are no special speed restrictions for vehicles making less than 20 m.p.h. The schedule speed of the Glasgow tramway system as a whole is 8.18 m.p.h. which, in view of the dense traffic, and low motoring, is not so much below American speeds as one might expect. In the outer sections, the cars make schedules up to 16 m.p.h., but in the crowded downtown streets it is hard to do better than 4 m.p.h. Hence if part of the downtown travel could be diverted to parallel streets, the increase in schedule speed would make it unnecessary to consider special non-surface rapid transit. The high density of travel keeps the scheduled running times unchanged all day.

To facilitate the movement of traffic, policemen are stationed at all busy corners. While the cars receive no special preference over other vehicles, this traffic officer may pass across an intersection several cars at one time. The traffic control officers are paid directly by the police department.

Of the various means used to apprise the public of tramway facilities, the zone boundary and stop signs in the street and the rate-of-fare cards in the cars, shown on this page, have already been mentioned. Before the paper shortage brought on by the war became acute,

the "Take One" box in every car also carried a condensed time-table of the line, showing the arrival times at terminals. Boards at the terminals show the times of departure of last cars and the like. The native is still able to pick out his car in daylight by its combination of body and superstructure coloring. Of course, a scheme like this means some extra expense in painting and is likely to be embarrassing when emergency traffic conditions call for the transfer of cars to other routes. All cars are provided with roller-type destination signs, in addition to which some of the cars carry roller-type route number signs—complete equipment having been interrupted by the war. These destination signs are readily visible within easy braking distance during the daytime but they are not directly illuminated. A roller destination sign is also installed on each side of the car interior, while the route of the car is indicated by painted wooden boards on the outer sides of the car.

For the stranger in Glasgow, the Tramways publish a 113-page guide book which is sold for the nominal sum of 6 cents (3 pence). About 500,000 copies had been printed with the issue of the fifth edition. This guide tells the story of Glasgow's past and present glories, route for route, with ample illustrations. A moderate amount of advertising matter helps to defray the cost of publication.

#### SHELTERS FOR WAITING PASSENGERS

Because of the extremely short headways, the Tramways have not gone extensively into the provision of shelters for waiting passengers. In fact, there are but two on the entire system. At Eglinton Toll Road, the shelter is little more than a glass-partitioned shed forming a flatiron extension of the building at this particular junction. At Catchcart and Battlefield Roads there is a more elaborate structure. This is at the junction of two important roads and in the vicinity of several public institutions. It is finished in tile inside and out and has large glazed areas and benches for waiting passengers. Those who prefer to stand outside have

TABLE OF FARES		
		TO OR FROM
Springburn and 161 Castle Street.	1d.	Springburn and Glasgow Cross.
Petershill Road or Garngaid Road and Duke Street.	1d.	Petershill Road or Garngaid Road and Rutherglen Road.
161 Castle Street and Glasgow Cross.	1d.	161 Castle Street and Alkenhead Road.
Cathedral Street and Rutherglen Road.	1d.	Cathedral Street and Govanhill (Dixon Avenue) or Polmadam.
Glasgow Cross and Alkenhead Road.	1d.	Rutherglen Road and Cathcart Bridge.
Rutherglen Road and Govanhill (Dixon Avenue) or Polmadam.	1d.	Alkenhead Road and Cathcart Terminus.
Alkenhead Road and Mount Florida.	1d.	Springburn and Alkenhead Road.
Govanhill (Dixon Avenue) and Cathcart Bridge.	1d.	Petershill Road or Garngaid Road and Govanhill (Dixon Avenue) or Polmadam.
Mount Florida and Cathcart Terminus.	1d.	161 Castle Street and Mount Florida.
	1d.	Cathcart Bridge and Cathcart Terminus.
	1d.	Glasgow Cross and Cathcart Terminus.
	1d.	Springburn and Mount Florida.
	1d.	Petershill Road and Cathcart Bridge.
	1d.	161 Castle Street and Cathcart Terminus.
	1d.	Springburn and Cathcart Terminus.

TABLE OF FARES, AS POSTED ON BULKHEAD OF CARS ON SPRINGBURN-CATHCART ROUTE

the shelter of a wooden marquee. The station includes a news and stationery shop, which, curiously enough, opens out only on the street instead of the waiting room as well. The original plan was to have the stationer act as caretaker in lieu of rental, but later it was decided to have him pay a fixed rental and leave the care of the structure to discharged soldiers who work in two shifts. The cost of this shelter was shared with the



statute labor department which has charge of the public lavatories, but the maintenance is borne entirely by the Tramways.

### ACCIDENTS AND SAFETY WORK

Like the average American, the people of Glasgow are hustlers and always ready to take a chance to save a minute or two. Therefore, accidents have always been plentiful. In recent years, the decrease in the number of experienced employees, the darkening of the streets for air-raid protection and the more intensive use of the cars available, have aggravated the difficulties. The climatic conditions of Glasgow—especially the long winter nights, the heavy rainfall and the smoke-laden fogs—are not encouraging either.

Previous to June, 1914, the Tramways carried accident insurance through the underwriters at a fixed sum per 1000 car-miles, and in case of an accident it simply turned over to them all papers for a settlement. On deciding to carry the risk itself, the railway started a safety-first campaign along the most approved British and American lines, but the rapid loss of experienced men made it impossible to get the full benefit of such work. This campaign will be renewed, however, when "the boys come home" from the demobilization camps. The value of a safety campaign was quickly demonstrated by the fact that during the first year of the work there was a great increase in the number of accidents reported but not in the number of accidents occurred.

From June, 1914, to June, 1915, there were 2434 boarding and 4281 alighting accidents; from June, 1915, to June, 1916, 1952 boarding and 3623 alighting accidents; from June, 1916, to June, 1917, 1703 boarding and 3541 alighting accidents; from June, 1917, to June, 1918, 1889 boarding and 2842 alighting accidents. Although the number of accidents has decreased, the cost per accident has increased. This is the direct result of war-time wages. Most of the accidents occur to workmen who are receiving greatly increased wages and they reckon the value of lost time accordingly. The higher cost of labor and material has also raised the cost of vehicular collisions. The fact that Glasgow people are intensely proud of their tramways does not deter a certain element from trying to mulct the city with the aid of the ever-ubiquitous ambulance chaser. Litigation of this character is much more costly to the defendant than to the plaintiff.

### THE NON-TRAMWAY RIDING IN THE GLASGOW DISTRICT

In spite of the extraordinarily heavy riding on the Glasgow Corporation Tramways, two other means of transportation enjoy the patronage of the city. One of these is the Glasgow District Subway, a cable road, and the other is the system of steam suburban lines.

The cable line is operated by the Glasgow Subway Railway Company. It is a double-track belt line, only 6½ miles long, which encircles the core of Glasgow on both sides of the Clyde River. Trains consisting of a grip car and trailer are operated on a three-minute headway from the starting of the first train at 5 a.m. to midnight. The round trip is made in thirty-five minutes.

Up to December, 1916, the company had a zone

fare which allowed a ride of one station for ½d., of five stations for 1d. and of more than five stations for 1½d. At present, the fare is 1d. for a ride of any length for adults while children under twelve, as before, ride for ½d. That this line has never been able to make much headway against the tramway service is apparent from the fact that its traffic over a long period of years has remained almost stationary whereas the street-car travel has grown enormously. For example, even the war curtailment of tramway service did not bring more than 17,948,170 riders for the year ended Dec. 31, 1917. As long ago as 1908, the cable subway carried 17,206,790 passengers. The receipts in 1917 were £73,413 and in 1908, £68,916, a slight increase per passenger because of the change to a flat or universal fare. The total train mileage for 1917 was 1,180,356 miles or 15.2 passengers per train-mile.

The traffic is not likely to increase greatly, even in case of electrification, as the distances covered are too short to warrant a person going up and down stairways when he can board a surface car within the belt-line territory practically inside a minute! The present owners can hardly be making a fortune, judging by the fact that the preferred shares earned only 2½ per cent during 1917.

Although the necessities of the great war brought about a reduction in the steam railroad suburban service, the competition from this source is by no means negligible. Unfortunately, separate suburban figures are not published. Trains are run at frequent intervals, however, to points within the 10-mile radius, the headway in some cases being as low as ten minutes. In addition to the radial steam lines there is an important double belt line to the south, serving the Langside district. This line is shown on the map on page 447. but the other steam lines are omitted.

The rates on the steam lines are considerably higher than those by tram. The rate to Renfrew, for example, is 7d. by steam and only 2½ to 3d. by tram.

The number of taxicabs and horse cabs in Glasgow has never been proportionately as large as in other big British cities. As for buses, there are none at all. In this connection, the writer asked N. O. Fulton, managing director of the Albion Motor Car Company, Ltd., Scotstoun, Glasgow, why Glasgow had no buses. He replied that the tramway service was too frequent to encourage the idea of competition. In some other cities the buses had taken hold because of unsatisfactory car service or because of congested street conditions and they were fulfilling requirements better than the vehicles which were tied inflexibly to a given line of track. The very short headways, the low fares and the public ownership of Glasgow's tramways had proved great factors in fostering the habit of using the cars—and the habit was one not easily broken.

Although no buses are operated in Glasgow at this time, there is a likelihood that several services will be instituted in the future as auxiliaries rather than competitors of the street car service.

The third, and concluding, article on Glasgow will deal with the type of rolling stock, the transportation employees including supervisory petty officers, the schedule department and the auditing of fare receipts and cash turned in by the conductors.







# Getting Better Economy in the Power House\*

Substantial Savings Are Possible, Particularly in the Boiler Room,  
Where in the Past Some Very Simple Expedients for  
Fuel Saving Have Been Overlooked

By G. H. KELSAY  
Electrical Engineer Union Traction Company of Indiana,  
Anderson, Ind.†

COAL is the source of power for practically all our properties. The United States possesses about one-half the coal supply of the world, sufficient to last us a period ranging from one hundred years to four thousand years. The first period is for a consumption increasing at the present rate, but the coal will last for thousand years at the present annual consumption. We have used to date about one-half per cent of this, as is shown graphically in Fig. 1.

One pound of coal of 11,000 heat units (B.t.u.) has stored in it, heat energy which if it could be changed to mechanical energy would lift a stout man ten miles or its own weight 2000 miles. If the energy in the coal

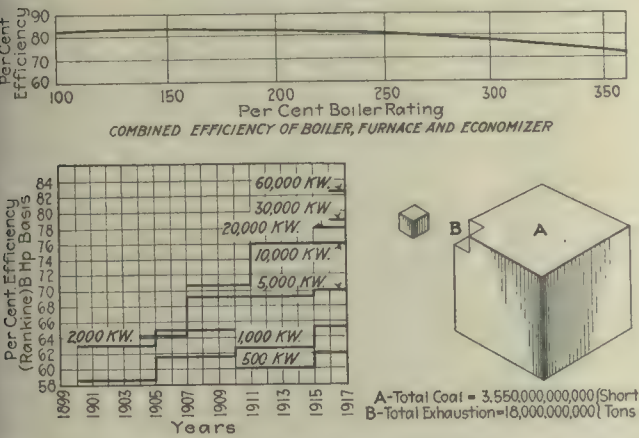


FIG. 1—RELATION OF BOILER LOAD TO EFFICIENCY, INCREASE IN EFFICIENCY OF STEAM TURBINES, AND RELATION OF COAL USED TO AVAILABLE SUPPLY

could be converted directly to mechanical energy at the car wheels, a motorman could easily carry enough coal in his cab to propel his car, and handling it would be no more of a burden than handling baggage.

## HEAT FINDS MANY STRAY PATHS

It is a duty of the operators in the mechanical and electrical departments to make every reasonable effort to deliver energy to the car with the least possible loss, and the purpose of this paper is to call attention to some of the practices that affect the efficiency of this process. Fig. 2 shows in a graphical way how the energy in the coal is consumed and what a small proportion is finally available at the car. The named losses are unpreventable, but they are all subject to decrease through intelligent selection and operation of equipment.

In one of its catalogs the Edge Moor Iron Company

states that figuratively the boiler is that part of the power plant where "money is burned" to make power. From an economic standpoint it is where the greatest saving can be effected and where the greatest waste is possible. The efficiency of the boiler room may be represented by the formula:

$$E = S \times B \times O$$

where  $E$  is the over-all efficiency of the boiler room;  $S$  is the stoker efficiency, affected by design of grate or stoker and furnace, and adaptability of the stoker to the fuel burned;  $B$  is the boiler efficiency, including boiler and setting; and  $O$  is the operating efficiency, including that of both firing and maintenance labor.

In his book on "Steam Power Plant Engineering" Gebhardt gives the following as a heat balance for bituminous coal, based on coal as fired for average practice:

	Per Cent of Calorific Value of Coal as Fired
Heat absorbed by boiler.....	65.0
Loss due to evaporation of free moisture in coal.....	0.6
Loss due to evaporation of water formed by combustion of hydrogen.....	4.3
Loss due to heat carried away by dry flue gas.....	17.5
Loss due to carbon monoxide.....	0.5
Loss due to combustible in ash and refuse.....	4.5
Loss due to heating moisture in air.....	0.3
Loss due to unconsumed hydrogen, hydrocarbons, radiation and unaccounted for.....	7.3
Calorific value of coal.....	100.00

## HIGH ASH CONTENT IN COAL CAUSES SERIOUS LOSSES

The reduction of boiler-room losses should start at the coal mines, as the greatest of these losses results from the high percentage of ash in the coal. This percentage has been subject to very great fluctuation during the past three years on account of the extreme demand for coal. The quality of the coal has not been so good and the coal has been less well adapted to particular plant conditions.

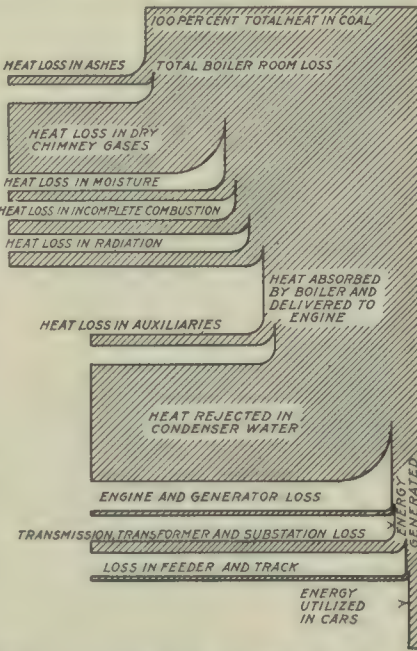


FIG. 2—DIAGRAM SHOWING HOW A LARGE PERCENTAGE OF HEAT IN FUEL IS DISSIPATED

\*Abstract of paper read at annual meeting of Central Electric Railway Association, at Cleveland, Ohio, Feb. 28, 1919.  
†On March 1 Mr. Kelsay became superintendent of power and equipment, Cleveland, Southwestern & Columbia Railway, Elyria, Ohio.



The effect of increased ash results in decreased heat value, increased tonnage consumption and increased necessary boiler capacity, as was well illustrated in an article prepared for the National Research Council, by W. A. Shoudy, of the J. G. White Engineering Corporation,\* from which Fig. 3 was taken. Increase in ash content reduces the heat units in the coal; causes greater loss to the ash pit because more heat is carried off in the ashes; results in a larger loss of combustible to the ash pit; prevents the firemen from being able to burn as much coal on the grate. Thus the capacity of furnace and boiler is reduced, the boiler efficiency is lowered, more boilers are required for a given duty, spare equipment is reduced and there is a decided lowering of general efficiency and reliability of the power plant.

All operators of power stations will be relieved and the cost of power production will be reduced when coal cleaner and freer from ash can again be obtained. It is reliably estimated that coal now contains on an average about 5 per cent more ash than during a period previous to that of the present high price and recent shortage.

#### HOW COAL BURNS

In Technical Papers Nos. 137 and 135 the United States Bureau of Mines outlines the fundamentals of coal combustion thus:

Combustion of coal is a chemical combination of the combustible ingredients of the coal with the oxygen of the air. The chief combustible ingredients of coal of economic importance are carbon and hydrogen in various combinations. Average commercial coal contains about 82 per cent of carbon and 4 per cent of hydrogen available for combustion. Air, without which the coal could not burn, contains approximately 20 per cent of oxygen and 80 per cent of nitrogen.

When carbon burns completely the product is carbon dioxide ( $\text{CO}_2$ ); when it is partly burned the product is carbon monoxide ( $\text{CO}$ ). If more oxygen is supplied, carbon monoxide can be burned to carbon dioxide. The hydrogen of coal burns to water vapor, which condenses to water when cooled to atmospheric temperature. The furnace gases therefore consist mainly of oxygen ( $\text{O}_2$ ), nitrogen ( $\text{N}_2$ ), carbon dioxide ( $\text{CO}_2$ ), and carbon monoxide ( $\text{CO}$ ). Besides these there may be found near the surface of fuel beds a small quantity of hydrogen ( $\text{H}_2$ ), methane ( $\text{CH}_4$ ), and unsaturated hydrocarbons. By analyzing the gases at successive points in a furnace the progress of combustion can be studied.

In practically all industrial furnaces the combustion of coal takes place in two stages, (1) combustion in the fuel bed, which includes the distillation of volatile matter and partial combustion or gasification of the fixed carbon; and (2) combustion of the gaseous and other combustible rising from the fuel bed in the combustion space.

The processes of combustion in a hand-fired furnace can be best explained by reference to Fig. 4. Here the curves show the percentages of the different gases at various points in the fuel bed and in the combustion space. The changes in the percentage of each gas indicate the process of combustion. The fuel bed is shown to be 6 in. thick. The oxygen ( $\text{O}_2$ ) is all used at about  $3\frac{1}{2}$  in. from the grate. At the same point the carbon dioxide ( $\text{CO}_2$ ) reaches a maximum of about 12 per cent. Beyond this point the percentage of  $\text{CO}_2$  drops and the percentage of carbon monoxide ( $\text{CO}$ ) and other combustible increases rapidly, showing that the  $\text{CO}_2$  is reduced by contact with hot carbon to  $\text{CO}$ . At the surface of the fuel bed the gases contain about 26 per cent of combustible, no oxygen, and about 8 per cent of  $\text{CO}_2$ . Air is added over the fuel bed and the combustible is burned in the combustion space. At the end of 7 ft. of the combustion space, the combustible gases are burned to 4 per cent and at the same time the  $\text{CO}_2$  increases to 14 per cent. With a combustion space long enough the percentage of combustible would be reduced practically to zero.

The three main processes in the fuel bed are the oxidiza-

tion of carbon to  $\text{CO}_2$ , the reduction of  $\text{CO}_2$  to  $\text{CO}$ , and the distillation of volatile matter. The zones where these three processes take place are indicated at the top of Fig. 4. These are called the oxidizing zone, the reducing zone and the distillation zone. The boundaries separating the three zones are not distinct, as the zones merge gradually into one another.

The combustion investigations of the Bureau of Mines are carried on in two parts. One part is the study of the processes of combustion in the fuel bed as affected by the rate of supplying air through the fuel bed, by the character of the fuel as regards structure and composition, by the thickness of fuel bed, by the method of feeding the coal and the air, and by the method of heating the coal. Investigations so far completed show that the fuel bed in most industrial furnaces acts primarily as a gas producer. The gases rising from a level fuel bed contain 15 to 32 per cent of combustible gases, about 8 per cent of carbon dioxide, and practically no free oxygen. This is true even of 6-in. fuel beds and rates of combustion as high as 120 lb. of coal per hour per square foot of grate. The second part of the investigation is the study of the process of combustion of the gases and other combustible rising from the fuel bed in the combustion space, after a sufficient quantity of air has been added.

The process of combustion in the combustion space is influenced by many factors, the most important of which are the following: The volume and shape of the combustion space; the kind of coal used, especially the character, and the amount of the volatile matter it contains; the rate of firing; the quantity of air supplied over the fuel bed; the rate of mixing the air with the combustible rising from the fuel bed; the rate of heating the coal; and the temperature in the combustion space.

The combustion process in the combustion space above and beyond the fuel bed is well illustrated in Fig. 5, reproduced from one of the above-mentioned bulletins, which gives the percentage of the main constituents of the furnace gases at various sections of the long combustion chamber. In connection with this the bulletin states:

The length or the volume of the combustion space required for practically complete combustion seems to depend chiefly on the percentage of excess air, the rate of combustion and the kind of coal. It is mainly these three factors that have been investigated in the series of tests that have been reported in this bulletin.

For given furnace and given fuel there is a percentage of excess air which gives the maximum over-all efficiency of a steam generating apparatus. If the supply of air is increased beyond this percentage the over-all efficiency drops because of the heat lost in heating this excess air. If, on the other hand, the air supply is decreased below this best percentage, heat losses increase on account of incomplete combustion. These are the two principal causes of heat not being available for the boiler, and the ones that are affected by air supply. The percentage of excess air giving the lowest sum of these combined losses varies with the size of the combustion space and the kind of coal. When the combustion space is large, smaller excess air is necessary to obtain a good combustion than when the combustion space is small. With coals having low percentage of volatile matter less excess air is needed for nearly complete combustion than when coals have high percentage of volatile matter.

#### WHAT QUALIFICATIONS MUST THE BOILER-ROOM OPERATORS HAVE?

It is evident from the foregoing that the proper combustion of coal is not simply a process of piling coal in the furnace, and the fireman should possess far more than individual strength sufficient to handle the required tonnage. It is a lamentable fact that our boiler-room forces, particularly during the past two years, have been composed of men picked off the labor market without particular qualifications for the work. The most intelligent man in the power plant should devote the major portion of his time in the boiler room, and the supervision of the fires should be his principal duty.

\*See issue of this paper for Sept. 21, 1918, page 504.



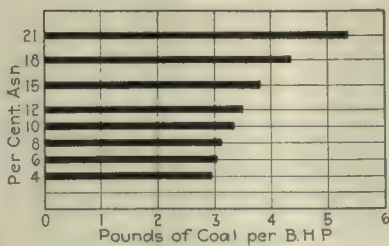
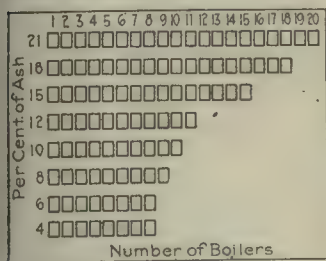


Fig. 3

FIG. 3—GRAPHICAL REPRESENTATION OF EFFECTS OF HIGH ASH CONTENT IN COAL. FIG. 4—PROCESS OF COMBUSTION OF COAL IN HAND-FIRED FURNACE

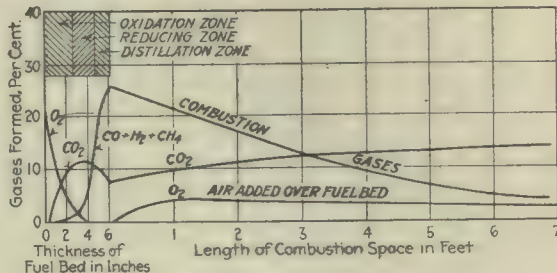


Fig. 4

This is not the rule in most plants. Engineers find the boiler room a hot and unattractive place in which to spend their time, and they have not been encouraged by having sufficient equipment (see Fig. 6) supplied them to permit them properly to measure all the operations in the boiler room. Unfortunately the managements have been satisfied with such practices.

Firemen should understand the theory of combustion in the boiler furnaces as far as possible. Of course there is much that even specialists still have to learn as to the proper relation of furnace shape and volume, stokers and arches, and of the adaptability of all these to the coals of various heat value, physical and chemical characteristics, but a great deal of information is available. Obviously, to burn coal economically necessitates the use of proper equipment and the continuous exercise of good judgment.

#### BOILER-ROOM PRACTICE CAN BE IMPROVED IN SEVERAL WAYS

To return now to the subject of improvements that are possible we realize that we have available for selection in hand-fired furnaces many types of grates, and in mechanically-fired furnaces, many types of stokers. Usually for each locality there are several possible sources of fuel. The first consideration for the plant operator is the selection of fuel adaptable to his plant. One car of coal is not the same as any car of coal because it may contain the same tonnage. One ton of coal is not better than another ton because it is 50 cents cheaper. For the past year or two we have been fortunate to obtain tonnage to keep our plants going,

but the opportunity to buy coal on a competitive basis may return because operators of inferior mines will wish to keep going the "operations" begun under war conditions. Although restrictions on coal supply by the government have been removed, my prediction is that coal will never return to the price level of four years ago, although if the operators do not restrict the output the price should drop somewhat. The law of supply and demand will again assert itself and operators will again see the necessity of furnishing well-prepared, clean coal. The question will be: What coal should a plant use? The answer is: It should be that which will "put the kilowatts on the switchboard" for the least money with careful consideration of all the items of expense involved.

To determine the fuel to use, the necessary evaporation tests on all the coals available should be made. The coals should be analyzed and such physical and chemical tests should be made as will determine the standard to be expected in future shipments. The purchaser should assure himself that the trial shipments are representative of the coal reasonably to be expected from a particular mine.

After good fuel supply comes good furnace handling.

#### HEAT LOSSES FROM UNINSULATED HOT SURFACES ROOM TEMPERATURE 70 DEG. FAHR.

Steam Pressure	Steam Temperature	Waste of Coal in Pounds per Square Foot per Year	Square Foot Surface That Wastes a Ton of Coal a Year
0	212	293	6.8
150	366	840	2.4
200	388	945	2.1
250	406	1,036	1.9

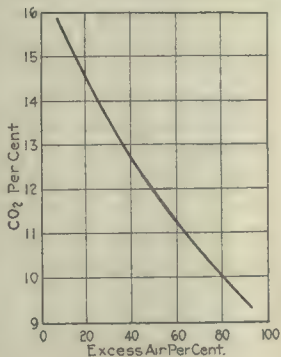
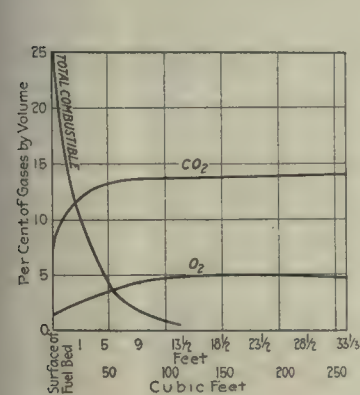


Fig. 5

%CO <sub>2</sub>	%Loss	Equipment to Obtain Economy
18	96	A—Scales weighing coal
16	100	B—Water Meter
14	122	C—Steam Meter
12	141	D—CO <sub>2</sub> Recorder
10	166	D—Thermometer
8	206	D and E—Draft Gage
6	276	
5	329	

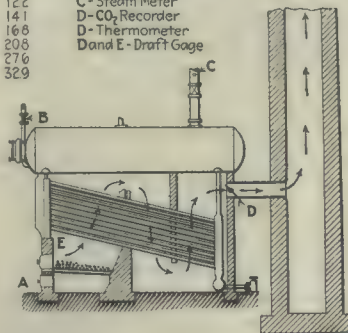


Fig. 6

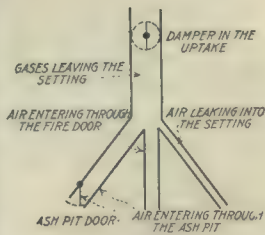


Fig. 7

FIG. 5—CURVES SHOWING PROGRESS OF COMBUSTION BEYOND FUEL BED AND EFFECT OF EXCESS AIR. FIG. 6 —APPARATUS DESIRABLE FOR ECONOMICAL BOILER OPERATION (TABLE SHOWS LOSSES FOR VARIOUS PERCENTAGES OF CARBON DIOXIDE). FIG. 7—DIAGRAM SHOWING WHY DRAFT SHOULD BE CONTROLLED BY FLUE DAMPER.



Hand firing is common in the smaller plants but the labor costs and great difficulty of getting efficient firemen makes stoker-fired furnaces usually more economical where large quantities of coal are handled.

Since the fresh fuel of a hand-fired furnace is placed on top of a hot fuel bed the volatile gases are distilled over the entire fuel bed and there is a demand for additional air to consume these volatile gases that must be supplied through the shutters of the fire door. There is a great variation in the requirement of air over the fuel bed during the processes of firing, hence small quantities of coal should be fired at frequent intervals.

The control of draft on a hand-fired furnace should be by means of a damper, and not by the ash-pit doors. Fig. 7 shows why this is important. If the damper is closed the quantity of air entering under the fuel bed and through the fire door, and leaking through the boiler settings is reduced. If the ash-pit doors are closed to reduce the draft the amount of air entering through the ash pits is reduced, causing the grates to heat and increasing the tendency to produce clinkers, and the air entering through the fire door and leaking through the boiler settings is enormously increased. This excess air through the fire door and setting is seriously detrimental to efficiency because the excess air is not combined with fuel to produce heat but cools the gases in the furnace and boiler settings and carries large quantities of heat up the chimney.

In the stoker-fired plant there are the oxidization, reduction and distillation zones but in a somewhat different relation to one another. Each type of stoker equipment presents a somewhat different problem of air supply, arch construction and operation for efficient utilization of the fuel.

Fig. 8, from Bulletin No. 135 of the Bureau of Mines, shows four typical furnaces and indicates how important it is that the fireman should know the fundamental principles of his particular equipment so that he can operate his fires to the best advantage.

The general rules for efficient furnace operation are these: Always maintain a hot fire. Control the rate of combustion to meet the demand for steam by controlling the air supply to the fire. Give the operating forces sufficient equipment to permit them properly to measure the operations they perform and demand of them an understanding and a continual use of this equipment.

#### FLUE-GAS COMPOSITION MUST BE WATCHED

From what has been said it is evident that the condition of the flue gases gives a good indication of the way in which a boiler is being fired, hence the value of flue-gas analysis. Since combustion in coal is a chemical reaction the analysis of the products of combustion should show in definite degree the efficiency of such operation.

Frequently too much air is permitted to enter the furnaces, filter through the setting and carry away large quantities of heat of combustion. The combustion of one pound of carbon to carbon dioxide requires 11½ lb. of air, and the heat thus produced is 14,540 B.t.u. If 100 per cent excess air should leak into the furnace or combustion chamber the products of combustion would be cooled to about one-half their original temperature. The absorption of heat by the boiler would then be much less efficient and the heat discharged by the stack would be twice as great as if just sufficient air was supplied. The percentage of CO<sub>2</sub> in the stack gases is very nearly a direct measure of the excess air and in

Percentage of CO <sub>2</sub>	Loss in per Cent of Coal Fired
18	9.6
16	10.8
14	12.2
12	14.1
10	16.8
8	20.8
6	27.6
5	32.9

turn a relative measure of the chimney losses. The above table shows the relation of percentage of CO<sub>2</sub> and heat loss for a stack temperature of 500 deg. Fahr.

It will be observed from the table that as the CO<sub>2</sub> reaches very low values the losses due to excess air become very high.

If the air is not supplied in sufficient quantities or is not well mixed there may be carbon monoxide gas formed. The heat produced by burning one pound of coal to carbon monoxide is only 4050 B.t.u., and, therefore, it is important to have complete mixture and adequate combustion space such that all combustible gases will be completely burned. Tests of the flue gases may be made to show the amount of carbon monoxide.

#### BOILER SETTING NEEDS CAREFUL ATTENTION

Properly designed and constructed boiler settings are absolutely essential to efficient operation. The maintaining a high CO<sub>2</sub> percentage in the flue gases is most directly effected by the condition of the boiler settings. Air filters readily through porous brick walls of boiler settings and through the cracks that are often found around side doors, inspection openings and supporting columns. This cools the gases and carries away heat that would otherwise be imparted to the boiler. Walls should, at least, be coated with a heavy-body elastic paint to prevent filtering and all cracks should be carefully stopped to exclude all air.

Baffling in the furnace is also important because it forces the gases to sweep over the tubes and impart heat to the boiler. It is an easy matter for operating men to permit baffling to become bad and to neglect repairs. The chief engineer should regard it as his personal duty to inspect and order needed repairs to baffling, even if he has a competent repair man for this tedious work.

The necessity for insulating boiler settings and steam drums has not been fully appreciated in past practice. Every square foot of heated surface, such as side walls, tops and ends of steam drums, becomes a radiator of heat and the heat radiated is almost directly proportional to the difference of temperature between the hot surface and the air. Modern specifications provide for an inch or more of insulating covering over the entire brick setting and steam drums, applied and maintained as carefully as any steam-pipe covering. Sometimes the entire setting is inclosed in steel casing to prevent infiltration of air. It should be remembered that boiler radiation losses continue at about the same magnitude independent of boiler capacity. If the boiler is working at low rating, these losses are just as great as if boiler was working at full capacity.

#### CLEANLINESS IS A CONSIDERATION ALSO

For the heat of the hot gases to reach the water inside the boiler it must pass through five obstructing layers, namely, a film of gases, a coating of soot and ashes on the outside of the tube, the metal of the tube, a coating of scale on the inside of the tube, and a steam and water film between the scale and the water. Of these two can be removed.



Soot must be removed by blowers and mechanical scrapers, rather than by the use of the hand lance or other crude methods that have proved to be so inefficient in the past. There are few data of any value on the losses due to soot on the outside of tubes, but testimony from those having carefully studied this subject is overwhelmingly in favor of this conclusion. Many of us experience trouble with clinker formation on the tubes, particularly on the rows adjacent to the fires. This may become very troublesome and sometimes the clinker almost stops up the gas passages, necessitating the shutting down of the boilers for cleaning.

Draft-gage measurements over the fire and at the breaching of the boiler are very essential in determining the extent to which the gas passages are being stopped up, as are also temperature readings at the breaching. These indicate the degree to which the tubes are being coated with soot because the gases passing from the boiler become hotter since the boiler cannot absorb the heat. Thus there is great loss of heat to the stack. Soot is an excellent heat insulator.

Next in order comes scale in the tubes. Most all boiler depreciation and maintenance of tubes and drums

not readily be detected when the boiler is in operation. Blow-off valves are a source of considerable waste of heat. In addition steam pipes, feed-water pipes, steam drums, receivers, separators and miscellaneous equipment carrying steam or hot water should be covered to reduce radiation losses. The losses from bare surfaces may amount to very considerable per year, as shown in the following table:

HEAT LOSSES FROM UNINSULATED HOT SURFACES

Temperature of Surrounding Air 70 Degrees Fahrenheit

Steam Pressure, by Gage	Steam Temperature, by Gage	Waste of Coal in Pounds per Square Feet per Year	Number of Square Feet of Surface Waste a Ton of Coal in 1 Year
0	212	293	6.82
100	338	718	2.79
150	366	840	2.38
200	388	945	2.12
250	406	1,036	1.93

Above figures are based on boiler efficiency of 70 per cent, using coal with an assumed heat value of about 14,000 B.t.u. per pound.

Covering of proper thickness and quality will save from 75 per cent to 90 per cent of the above losses.

All engineers know that there is a substantial saving by heating boiler feed water because such heat as is put into the water before it enters the boiler does not have

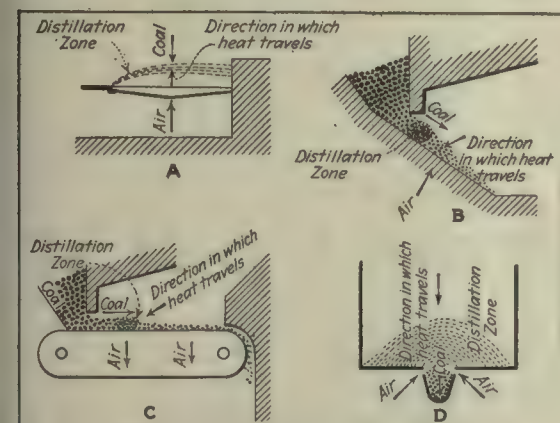


Fig. 8

FIG. 8—FOUR TYPICAL BOILER FURNACES—A, HAND-FIRED; B, OVERFEED, INCLINED GRATE; C, CHAIN GRATE; D, UNDERFEED. FIG. 9—EFFECTS OF SUPERHEAT AND VACUUM ON TURBINE OPERATING ECONOMY

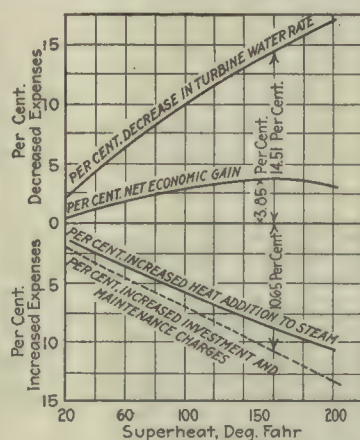
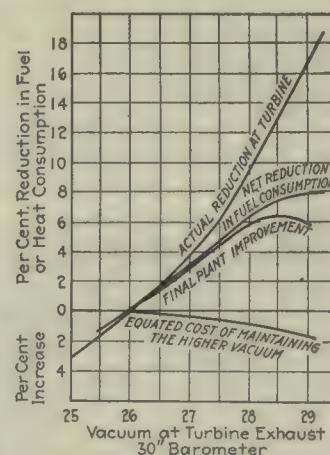


Fig. 9



are due to scale. Tubes are not burned unless they are dirty inside. If water must be treated chemically inside the boiler, it should be done scientifically, but the proper place for treating boiler feed water is outside the boiler. Materials that could cause an encrusting solid should be removed before they are pumped into the boiler. If such a process is carefully carried out it is most economical and successful. The effects of scale are somewhat uncertain but it certainly causes considerable losses.

Certain kinds of soft scale resist the flow of heat very little, whereas scales of other compositions may restrict it seriously. One authority gives us the following as the average loss on account of scale in boilers:

Average Thickness, Inch	Coal Wasted per Ton Fired, Pounds
1/50	100
1/32	140
1/25	180
1/20	200
1/16	220
1/11	300
1/9	320

Operating engineers should be on the lookout for leaks of boilers within the settings, such as those around nipples and tube ends, and in locations where they can

be supplied by the fuel of the furnace. Many plants can increase the temperature of the boiler feed water by more careful conservation of the exhaust steam from auxiliaries and better maintenance of feed water heaters. In many plants full advantage is not taken of this source of saving. The saving will amount to about one per cent for each eleven degrees added to the boiler feed water.

#### SOME SAVINGS ARE POSSIBLE OUTSIDE THE BOILER ROOM

So far attention has been given only to the boiler room. There is not usually the chance of saving so much in the engine room. Turbine and engine equipment with reasonable care may operate nearer their maximum efficiency than boiler-room equipment. There are, however, many small sources for improved economy here also. The average engineer spends more of his time in the engine room than the boiler room and knows more about what is required to maintain efficiency there.

Reciprocating engines should be given particular attention to insure tightness of valves and pistons and correctness of valve setting for the conditions under which they must operate. Indicator cards should be







taken at sufficiently frequent intervals. Regular inspections should be made of the valves and pistons to detect conditions that may not be shown by indicator cards.

The performance of turbines and engines is much improved by superheating steam. Where plants are equipped with superheaters an endeavor should be made to keep them in condition to furnish maximum superheat. The gain due to superheat in reciprocating engines comes mainly from reduction in cylinder condensation, while in turbines it results primarily from reduction in windage. In the turbine the steam consumption is improved about 1 per cent for every 6 to 14 Fahrenheit degrees of superheat. Fig. 9 shows these relations.

It is essential also that the most economical vacuum shall be maintained. Poor vacuum, where such occurs, is probably due to failure to keep condenser equipment tight and the air and circulating pumps in good working order.

Turbine economy drops off very rapidly for slight reduction in vacuum. Fig. 9 shows the relation of vacuum and heat reduction for a typical turbine installation. In general there is a decrease of steam consumption of about 5 per cent for each inch of vacuum between 25 and 27 in. vacuum, 6 per cent between 27 and 28 in., and 8 to 12 per cent between 28 to 29 in.

Another fruitful source of loss is through leaky steam traps. Valves and valve seats of steam traps wear and leaks may develop that may not be observed by the chief engineer. Other leaks which may develop are those in packing around valve stems and pipe line joints. These may not appear important, but they are so easily neglected that they are often allowed to continue for a long time. A leak never mends itself and the final cost of repairs is equal to what it would have been at the time the leak developed. Hence, the loss, whatever it is, is a complete one and oftentimes it goes on at an accelerating rate. The following table is suggestive:

LOSS DUE TO STEAM LEAKAGE		
Size of Orifice, Inch	Pounds of Steam Wasted per Month	Total Cost per Year
	300,000	\$840.00
	75,000	204.00
	19,000	53.00
	4,800	13.30

Steam pressure 150 lb; coal at \$3.50 a ton.

Permitting leaks to continue in the plants develops careless maintenance and a careless operating force. One reacts on the other until oftentimes conditions become deplorable. With the present high price of fuel, high cost of labor and keen competition we should all do our very best to reduce our power station loss to a minimum.

# Merchandising of Transportation Is Lacking\*

## Greatest Need of Electric Railway Freight Business Is Active Traffic Organization and Proper Merchandising Methods Based on Public Psychology

By A. B. COLE

Westinghouse Electric & Manufacturing Company

**F**REIGHT transportation, as a commodity to be marketed, must be considered from all angles for electric railways to be most benefited. Usually when speaking of freight, we think immediately of the shipper. Let us analyze, however, a few other important factors that must be considered.

**Law-Making Bodies:** Many lines throughout the country are suffering from unjust restrictions imposed by national, state and municipal authorities. By proper cultivation and some missionary work, these should be made to see that the electric railway performs an economic duty inseparable from the welfare of those served. It seems the paramount duty of all railway operators to be active in chambers of commerce and as many business organizations as possible, so that the business public will find that they are human and that there is a personality behind the business.

**Public at Large:** Make the public think the "electric way," and it will soon realize that electric railway freight is delivered with despatch and often at a more convenient point than by other agency. In other words, advertise service—not rates. Why has the motor truck been able to interest the public so completely? Aggres-

sive and effective publicity surrounded the motor truck with a "veil of romance," and it hitched patriotism and service in the same team, making them almost inseparable. The electric railway needs only to tell and keep on telling its story of service.

**Shippers:** These need to be fully informed of the freight service in all of its ramifications. They should also be told that the service is backed by proper facilities and handled by an experienced traffic man who knows how to sell freight transportation.

**Electric Railway Operators:** In many instances the management thinks of only passenger traffic. Hence in many organizations it will be necessary to arouse interest in "freight service" before any appreciable results may be expected from the people.

**Traffic Bureau:** The sale of freight transportation can be most effectively accomplished through the institution of an aggressive traffic organization supported by effective advertising. Moreover, the traffic developed must be properly handled in order to be held. This is only possible through the co-ordination of all freight-handling facilities in the community and the proper co-operation of all railway managements involved in through-routing. Here the well-paid traffic manager is a valuable investment, for he must not only look after

\*Abstract of paper presented at annual meeting of Central Electric Railway Association, Cleveland, Feb. 28, 1919.



the development of freight business but also see that there is no break in the service. The freight solicitor proper should be used with considerable discretion. Usually, he is of the order-taker type, having only a general knowledge of rates and knowing little of the elements which make the service. In most cases the results of the experienced traffic manager's personal efforts are so singularly superior that solicitors are not needed.

**Service:** The electric railway is in a position to give service superior to that of its competitors, but unfortunately it has failed to tell the public in a convincing way about this service. The electric railway excels in time of transit and in the handling of merchandise or despatch freight. The most profitable or car-load business, however, remains undeveloped to any great extent. Were the handling of bulk freight developed, the revenue derived would greatly increase that now received from the l.c.l. freight, which is the more expensive to handle.

Few lines handle sufficient cars in one train to justify the tonnage at the rate received. Much of the freight handled takes a high-class rate and is delivered in small quantities at the minimum supply. An analysis must be made to determine what classes of freight should be solicited in order to even up the revenue conditions or to eliminate the tremendous amount of freight minimums. All of this must be sold as "service," and when transportation is marketed on its merits, the rate charged will be secondary with the shipper.

**Rates:** In general electric lines have waited for the steam roads to take the initiative in obtaining increased rates. The electric railways have rarely fought for the broad principle of a special rate based upon the superior service rendered. Proper publicity and constructive work by the traffic departments often would persuade the public to pay the higher price that better service deserves. Early morning delivery of overnight shipments and accessibility to stations entitle the electric railway to a differential wherever speed is the essence of the contract. Often electric service is worth 25 per cent more than steam service to the same destination. Some utility commissions and chambers of commerce appreciate these inherent reasons for higher rates, but sales methods are required to market the superior product of freight transportation, build up more business and increase revenue regardless of steam rates.

**Facilities:** In order to secure and handle freight business, confidence must be inspired in the shipper. Proper facilities are necessary. Not only rolling stock, both motive-power and trailing, must be provided, but terminals and station layouts (according to the character of the business to be handled), including passing and industry tracks at way-stations. In many cases it is necessary for the company to assist in locating grain elevators, coal yards, lumber yards, stock yards and loading chutes, and sometimes these can be located on the railway's property with long term leases.

Two paramount results which must be accomplished before an extensive and flexible electric railway freight service can be profitably instituted in the various states, both for inter-state and intra-state traffic, are the standardization of freight rolling stock and the pooling of trailing equipment. The pooling system particularly applies to the handling of inter-line trailers, of which there is a drastic need at present. The Central Electric Railway Association has already done considerable pioneer work along both of these lines.

One of the things which has made possible the extensive development of freight interchange on the steam railways has been the flexible working of the interchange pool, which was operated on the per diem basis before government control. Some particular method will have to be adopted by electric railways in order more extensively to develop interline traffic. There must be no restriction as to destination so long as there is a pair of "electric" rails, reaching to points far and wide. This would be adhering to one of the fundamentals of economical freight operation, which is to keep freight on its original wheels as long as possible.

#### MERCHANDISING IS NEEDED

The lack of merchandising of transportation among electric railways is so evident that authorities in other fields comment on it. Recently *Printers Ink*, an important advertising magazine, printed the following editorial:

What is the matter with the public utilities, especially the electric railways? Many of them seem to have a larger variety of troubles than ordinarily falls to the lot of any one business. They are abused and railed at from every side.

On the one hand, they have lost the confidence and good will of the public, and on the other hand, they have won the suspicion and often the opposition of the state and city officials. From the back, investors are inclined to withhold their support, and in front, the companies are confronted with ever-increasing operating costs. In many cases, rate increases would seem to be a necessity, but because of the bitter feeling that exists toward the utilities it is impossible for them to get permission to advance their charges. The stopping of the war does not hold out any relief to them.

What is wrong? Why should a business that renders the public such a necessary service be so mistrusted? In many cases at least the trouble is that the management of these companies lacks a modern merchandising viewpoint. It may be able to give fair service, but lacking the selling instinct it is unable to sell this service at an adequate price. In any properly advertised business, it is easy to get a just price for the product. When a business' customers are sold on its fairness, they are always willing to pay any necessary price advances.

It would appear, therefore, that where a public utility is rendering satisfactory service, better selling methods would overcome many of its problems. In numerous cases, however, the poor service, that the companies are giving is the cause of their troubles. Here again we often find that the actual head of the operating end of the property is not a salesman. Often he has no real authority. The real bosses of the system are the financiers who control it. Frequently, these men have no direct connection with the sales end of the business. They have no knowledge of the physical needs of the property and no conception at all of the service requirements of the public. All they do is to look to the operating head to make the system pay, and, lacking authority to institute necessary changes, he is not able to accomplish anything. Thus the thing goes around in a vicious circle.

What is needed is proper co-ordination between the financial and the operating ends of the business. Then as the active head of the system should be placed a man who in the first place can give adequate service, and after that is able to sell it and to get a compensatory price for it. This is the way our big industrial corporations are successfully managed. It is the way our harassed public utilities should be managed. Until they are thus managed, the cry for public ownership of these systems will keep on rising.

The question naturally arises as to whether freight service should be advertised. It would be wasteful for one line of a system to try to attract business from one of its other lines. But it is wrong not to inform the public generally on the matter of the quickest and the best route to market its goods, and tell whom to see when in trouble and where he is located, etc.

In the education of the farmer by the Bureau of Markets, pointing out to him how best to market his products, the electric railway can do much good by running in



farm publications constructive advertising copy calling attention to its published pamphlets, schedules and general articles describing briefly its facilities. In view of the fact that a large number of the farm papers are more or less localized to certain sections of the country, covering only a few states, it is easily possible to find a medium that will effectively cover a railway's territory. The farmer has a drastic need for an effective marketing system for his products. The electric railway can help through its traffic bureau being definitely informed as to marketing conditions throughout the territory served. Much traffic can be attracted to lines by the freight personnel coming into intimate contact with associations of farmers and other business organizations which have to do with the marketing of products at some city or center. The traffic department can investigate conditions around the important markets and act in an advisory capacity, so that the farmer can feel safe in shipping his products to commission brokers recommended by the railway.

In some cities the steam railroads go so far as to provide a terminal where farm products are shipped to certain commission brokers for daily sale or reconignment to local dealers. This same scheme is possible in the electric railway field. The scheme of the purely farmers' market in many cities has too often proved a failure to require any further comments at this point, other than that attempts to use the electric railway for handling produce to such markets generally have been expensive and in many cases unsatisfactory, unless it was possible to move all goods by carload lot.

Manufacturing industries also present great possibilities for development of electric railway freight traffic. These industries are located many times in centers of distribution so that carload shipments of products can be easily handled by the use of trailers to points on the electric line. This also holds good for large wholesale and distributing companies—for example, such as chain stores. In this case the main warehouse for a chain of stores may be located at some central point where the electric railway can handle all traffic to the various stores in the chain. This presents a continuous flow of traffic which insures the electric railway a profitable return, as most of this freight moves in large quantities and sometimes carloads.

#### COMPETING WITH THE MOTOR TRUCK

With the United States Railroad Administration economizing in its freight service, passing up the way stations and giving adequate attention to only the larger terminals, it behooves electric railways to see that the motor truck does not take advantage of the lack of service performed by the steam railroads to points which are inherently those covered by electric railways. In different parts of the country we now find motor truck lines well established for handling freight as well as passenger traffic. In the rarest cases do we find the motor truck acting as a feeder to electric lines. Generally it is taking the cream of the traffic which belongs to the electric railway.

Unfortunately, the advertising which was used by the Highways Transport Committee under the auspices of the Council of National Defense has done considerable unintentional harm to the electric railway industry in the way of furthering motor transportation. With this constructive literature not only went material explaining to the public in general that it was patriotic to use the motor truck in that this meant "saving a

freight car for Uncle Sam," but there was also instructive literature published which would aid the motor-truck owner to establish freight routes.

Moreover, the establishment of the Return-Loads Bureaus was an attempt to stabilize motor-truck transportation. Not only the Council of National Defense, through the Highways Transport Division, did everything to promote this movement, but even the Post Office Department expressed considerable sympathy for it. The perfection of the return-load system was expected to prove a boon to manufacturers of specialties, who, for the very reason that they ship in less-than-car-load lots, have suffered most severely from the traffic jam on the railroads. Through this scheme of return loads, and other things, it has been possible for the motor truck to establish itself in the minds of the shipping public as being a first-class means of handling freight.

From the foregoing it can be readily seen that the motor-truck promoters are wide awake and aggressive. Therefore, it seems high time for united action from the electric railway industry. It is important that the industry be awakened to the fact that it will be necessary to co-ordinate all the available facilities and aggressive methods of conducting business in order to combat the encroaching competition from the motor truck.

Some of the more or less sane motor-truck operators feel that the function of trucks is to act as feeders to existing transportation systems, and especially to the electric railway, owing to its rapid transit. Possibly the ultimate solution of this problem lies in the regulation of the motor truck by the several states and in the use of the electric railway and the motor truck in one or all of three ways:

1. Let the motor truck be used as a direct feeder for l.c.l. freight to the electric railways.
2. Through a system of containers let the motor-truck operators, like forwarding agents at seaboard, collect freight from certain distribution centers to be shipped via the electric railway.
3. Let the motor-truck be used in shuttle service between electric railway systems that require a link for a through freight route.

The foregoing remarks have been made with the intention of pointing out a few fundamentals that will have to be considered in developing freight traffic. Much remains to be said about facilities, but the greatest action necessary is the provision for organizations to develop freight traffic, backed by proper merchandising methods and aggressive salesmanship based on public psychology.

#### Electric Railways in China

According to a recent report of the Department of Commerce, only three cities in China have electric railways at present—Shanghai, Tientsin and Hong Kong. Canton is considering the installation of one, and Mukden, in Manchuria, has a horse-car line. The line in Shanghai is the largest and in 1916 had 25.8 miles of track, ninety motor cars, seventy trailers and seven trackless trolleys. The company had a capital stock of \$1,600,000 on which in 1916 it paid 10 per cent. There is a second line in the French concession and a native system in the Chinese city. Most of the development has been in the hands of the British and most of the equipment was made in England.



# Power Plant Economies and Freight Discussed

## by C. E. R. A.

At Cleveland Meeting of Feb. 27 and 28 Papers by G. H. Kelsay and A. B. Cole Brought Out Much Further Information

**A** PARTIAL report of the proceedings of the annual meeting of the Central Electric Railway Association, held at Cleveland on Feb. 27 and 28. was given in last week's issue of this paper. It covered principally the Thursday program. On Thursday evening nearly 270 persons participated in a dinner-dance in the grand ball-room of the Hotel Cleveland. On Friday morning papers were presented by G. H. Kelsay, on "Power House Economies," and A. B. Cole, on "Development of Freight Traffic on Interurban Lines." The papers are abstracted in this issue.

### J. T. BEASLEY SPEAKS AT BANQUET

The only speaker after the dinner on Thursday evening was John T. Beasley, an attorney of Terre Haute, Ind. The program was arranged thus to give the speaker ample time to cover his subject thoroughly and to permit early closing for the dance. Mr. Beasley's central topic was the fundamental essentiality of electric transportation, and its right to existence and protection. There are, he said, no fundamental legal barriers to the raising of rates if failure to raise them would constitute virtual confiscation. There is a reserve power in law and in government which will take care of the exigencies of a situation like that in which the electric railways now find themselves. Relief will be granted them because justice demands it.

Mr. Beasley pointed out, however, that success depends upon adapting equipment to the service which the public demands. We are in a time of change, but not all change represents progress. Real progress is the need of the hour. In view of the future that there is for the electric railway transportation industry there is every reason why managers should "stand by their guns" in its defense. They are trustees for the properties which they operate and they represent the interests of those who have invested funds in the enterprise.

### FRIDAY MORNING DISCUSSION ON POWER PLANT ECONOMIES

A lively discussion followed the presentation of Mr. Kelsay's paper. In answer to a question as to the most economical vacuum to be maintained in a power plant, he said that this depends so much upon local conditions that no general average can be stated. Another question related to the possible advantage of a thin scale in boiler tubes to prevent corrosion. Mr. Kelsay said that such scale is not desirable.

L. P. Crecelius, superintendent of power Cleveland Railway, said that, as pointed out in the paper, the keystone to the whole situation is efficient operation of such facilities as are now available. It is quite likely that the price of fuel will remain higher than heretofore, as the two large items of high labor and transportation costs will operate to sustain the price of fuel some 60 to 70 per cent above the former level. As a consequence all attention must now be concentrated

upon the judicious use of this fuel. Several means of doing this have not been generally used, but the time has now come when neglect to practice obvious economies cannot be justified or tolerated.

To the economies listed by Mr. Kelsay Mr. Crecelius added the following:

1. In boiler plants the addition of mechanical soot blowers may result in a saving of 5 per cent in fuel when these are properly installed and operated in conjunction with pyrometers whose thermal couples are so placed in the boiler setting as to yield a continuous record of the temperature of the gases escaping to the smoke stack.

2. In plants not already equipped with superheaters a fertile field for economizing exists. A moderate degree of superheat, say 50 deg. Fahr. at the throttle for reciprocating engines and 75 deg. for turbines, may yield a fuel saving of 5 per cent.

3. In general too little attention is given to the extravagant losses from excessive blowing-off of boilers and water columns, and neglect of maintaining control valves in good condition. A good plan is to gather every form of drainage from boilers into a common main which ends in a suitable tank. This should be provided with a recording pyrometer as a check against excessive blow-off intervals and duration, and to indicate leaks. With this arrangement the tank water will always be hot unless all leaks are stopped. Thus the blow-offs can be cut down to the minimum, the limit being set by the feed-water quality. Careful attention along the line indicated, including the stopping of safety-valve blow-offs, can save 5 per cent in fuel.

While the installations suggested may require some additional capital expense, the devices are not very expensive and their use is fully justified by the present high cost of fuel.

M. B. Lambert, Westinghouse Electric and Manufacturing Company, said while power house economies are important, economy in the operation of cars should not be overlooked. Charles L. Henry, Indianapolis & Cincinnati Traction Company, emphasized the necessity for taking advantage of the savings suggested in order to offset the increased cost of getting coal out of the mines. W. E. Rolston, Chicago, Lake Shore & South Bend Railway, said that car and power plant operation are so closely related that they must be considered together. For example, judicious use of trailers during rush hours might have a beneficial effect on the power plant load. Another speaker, referring to plant personnel, urged that positions in the power plant be made attractive to technically trained men. Otherwise the railways will be dependent upon men whose experience has not been sufficiently wide to enable them to secure the economies outlined by Mr. Kelsay. H. H. Norris, ELECTRIC RAILWAY JOURNAL, gave results of a sample calculation to show the importance of practicing economies in the boiler room, where the greatest savings are



possible. He estimated that \$45 per day could be saved in fuel in a 5000-kw. plant, with a load factor of 30 per cent and a coal cost of \$6 per ton. Mr. Crecelius made the point that CO<sub>2</sub> recorders must be used in conjunction with intelligent flue-gas analysis. He also cited a case where in a coal contract provision is made for a price reduction when the ash content exceeds a prescribed amount.

#### DEVELOPMENT OF FREIGHT TRAFFIC ON INTERURBAN LINES DISCUSSED

F. D. Norviel, Union Traction Company of Indiana, opened the discussion on Mr. Cole's paper by pointing out some of the practical aspects of the situation. The cost of handling freight on electric lines had proved to be much greater than was originally supposed. The same situation was disclosed with respect to the steam roads in connection with their applications for rate revisions. The accounting end of the electric freight business had not received the attention it deserved. Mr. Norviel expressed approval of Mr. Cole's ideas regarding advertising, and said that publicity campaigns should be conducted by groups of electric railways rather than by individual roads. He believes that personal solicitation is even more effective than advertising, but that this should be supplemented by printed matter giving rates, schedules, points reached, etc. If the electric railways would pool their advertising expenditures much better results could be secured.

C. E. Morgan, Michigan Railway, showed the economy of handling freight at night, thus making possible the better use of the railway facilities. Early morning deliveries are greatly appreciated by shippers. Electric lines have now a great opportunity to develop this business on account of the present disinclination of the steam roads to cater to short-haul traffic. Prompt action will solve the problem of motor-truck competition. C. A. Laney, Northern Ohio Traction & Light Company, expressed the belief that the collection and delivery feature must be added to the freight service. He urged that legislation be secured to impose fair road taxes on the motor-truck owners, as it is lack of these that makes it possible for the trucks to take legitimate business from the railways. Mr. Morgan replied that collection and delivery add unwarranted expense to the service and he does not believe their use to be expedient. Bert Weedon, Interstate Public Service Company, made an informal statement for the Indiana committee on motor truck competition to the effect that the committee favors an aggressive advertising campaign. He believes in pick-up and delivery service.

#### PRESIDENT-ELECT COLLINS TAKES THE CHAIR

After the discussion on freight matters President Coen announced that Secretary-Treasurer Neereamer's report had been printed and that it shows the society to be in flourishing condition. He called for the report of the nominating committee which was approved unanimously and the candidates to office were declared elected. The list of names was printed last week.

In resigning the chair to his successor, Retiring-President Coen thanked especially those who prepared papers for this and previous meetings, and expressed appreciation for the co-operation which he had enjoyed. Mr. Collins, in taking the chair, expressed his desire particularly that the boat ride in July should be a great success. The meeting, which all present considered one of the best ever held, then adjourned.

## Italy Prefers Straight to Zone Fares

### Application of Extended Zone Plan to One-Man and Other Recent Types of Cars Presents Difficulties

BY FERDINANDO C. CUSANI  
Milan, Italy

I HAVE read with much interest the letter from I. H. Moir, published in your issue for Dec. 21, and I would like to point out some facts relating to the controversy between zone versus straight fares.

While the zone system originated in Europe, it is by no means universal on this side of the Atlantic. Many of the largest street railways in Italy, for instance, have always been operating on a straight-fare basis, while there is a very strong movement toward the abandonment of zone fares in city transit service.

Most of the municipally-owned systems are operated on the basis of straight fares, and many private properties have adopted them, either wholly or in part, especially when they have had to fight municipal competition. And whenever new contracts or franchises are considered, the straight unit fare is always set as an absolute condition for city service, while a return to the



COMMUTATION TICKET USED ON ROME  
MUNICIPAL TRAMWAY

zone fare is as far from the minds of the regulating bodies as the thought of returning to the horse cars of olden days.

Of course some of the special fare arrangements which seem so greatly to disturb rapid transit executives in the United States are not in use in this country. Transfers, for instance, are never issued so freely, and on some of the bigger systems (in Milan, for instance) they are not issued at all. Strip tickets also are wholly unknown. On the other hand, reduced early morning fares and commutation tickets are an almost universal practice in Italy.

These commutation tickets, which as a rule are issued for one month, three months, six months or one year and carry a perforated photograph of the bearer for identification, are good for any number of rides during the period for which they have been issued, either on one line or on a given number of lines or on the whole system, according to the price paid. On the Rome municipal lines, for instance, a commutation card good for one line and one month costs 6 lire and 20 centesimi (about \$1.16) while a monthly commutation card for the whole system of ten lines costs 15 lire and 60 centesimi.

Italian straight fares average 15 centesimi (3 cents) for regular service and 5 centesimi (1 cent) for early



morning traffic between 6 and 8 or 8:30 o'clock, with a few systems charging 10 centesimi (2 cents) for morning service, 20 centesimi (4 cents) for all-day service and 25 centesimi (5 cents) for owl service. With the exception of the morning fares, which aren't taxed, all other fares include a tax of 5 centesimi (1 cent) per ride levied by the government, which thereby assumes the burden of paying all war bonuses and wage increases to traction employees. When one realizes that many of these straight-fare street railway systems though having had to fight with a metal, materials and supply situation much worse than that which has taken place in America (girder rails for instance, whenever they could be found, up to last November were paid for at the average rate of 25 cents a pound) were actually making money, one cannot but speak highly of the popularity of this scheme over here.

And now, talking about American railways, I should really like to see the happy results of applying the British zone ticket scheme to the latest designs of prepayment cars; let's say, for instance, to the Birneys or the Peter Witts. How could the passengers be checked up without undue complication? Or how could overriding efficiently be prevented without the addition of a very strong inspection force, which would necessarily entail the use of one more man for every few cars? The Mahoning & She-mango Railway seems to have resorted to the system (which seems only practicable on Peter Witt cars) of fare tokens distributed by the motorman when the passenger boards the car. Such a plan might be feasible in cities of

such relatively small size as Youngstown, Ohio, but the same plan could hardly be carried out along Broadway or Forty-second Street in New York City, where the traffic and the operation of the car are bound constantly to absorb the attention of the motorman.

And how will the motormen-conductors of Birney cars deal with overriding passengers? Will they have to leave their post, thereby making an emergency stop, whenever a passenger attempts to ride farther than his ticket allows him? Or will they wait to nab him when he tries to get out, thus interfering with the collection of fares from entering passengers? And how will they manage to issue a number of widely different types of tickets, punch them and make change without considerably increasing the length of the stops, thereby absolutely "killing" all the good points and qualities which allow the one-man safety car to be a real relief during rush-hour congestion?

Mr. Moir seems to overlook one more fact; that is, that all of the modern traction equipment in the United States is built for and operated along the prepayment plan. The reason for this seems to have been both the promotion of safety and the assurance that all rides shall be paid for. Most all of these cars are equipped with door and step control of some kind, which must be operated by the conductor from a fixed point. All of them, barring the Peter Witts, afford only small ca-

capacity for prepayment while in motion, and the secret of their success lies only in the simplicity of fare-box and straight-fare collection. Would you like to imagine, for instance, a Montreal pay-as-you-enter train loading on a snow-storm day and the conductors fumbling with a series of tickets of the British type, that is to say, all different, small and capable of being punched only with difficulty? What would the prospective car riders think of the scheme, and wouldn't this be a splendid opportunity both for the jitneys and Henry Ford's "tin Lizzies"?

# PREFERS PAY-ENTER-PAY-LEAVE PLAN

If I may express my humble opinion on this subject, I would say that the only scheme that seems rather fair and feasible is the two-zone pay-enter-pay-leave plan, as used in some American cities now. This system, though not perfect, seems to be the only method that may rather easily be applied to the thousands of pre-

SOCIETA' DELLE TRAMVIE E FERROVIE ELETTRICHE DI ROMA 042463														
Stazione	01	02	03	04	05	06	07	08	09	10	11	12	13	14
Termini	2.00	1.70	1.40	1.35	1.20	1.15	1.05	0.85	0.75	0.60	0.35	0.25	0.15	
01	1.75	1.50	1.20	1.20	1.10	1.00	0.85	0.70	0.60	0.45	0.20	0.15	0.35	
02	1.70	1.45	1.15	1.10	1.00	0.85	0.75	0.60	0.50	0.30	0.15	0.25	0.50	
03	1.60	1.35	1.05	1.00	0.80	0.75	0.65	0.50	0.35	0.20	0.15	0.35	0.55	
04	1.45	1.20	0.85	0.75	0.60	0.55	0.45	0.25	0.15	0.15	0.20	0.45	0.60	
05	1.35	1.05	0.75	0.60	0.45	0.35	0.25	0.15	0.15	0.20	0.30	0.50	0.70	
06	1.20	0.80	0.60	0.50	0.30	0.25	0.15	0.15	0.20	0.30	0.35	0.60	0.75	
07	1.10	0.75	0.45	0.30	0.20	0.15	0.20	0.25	0.30	0.45	0.50	0.65	0.85	
08	0.80	0.65	0.30	0.20	0.15	0.20	0.30	0.35	0.45	0.55	0.55	0.75	0.80	
09	0.85	0.55	0.25	0.15	0.20	0.30	0.45	0.50	0.55	0.85	0.65	0.85	1.05	
10	0.75	0.45	0.15	0.15	0.25	0.35	0.50	0.55	0.60	0.70	0.75	0.80	1.15	
11	0.60	0.30	0.20	0.30	0.45	0.55	0.60	0.85	0.75	0.80	1.00	1.20		
12	0.25	0.15	0.20	0.30	0.45	0.55	0.60	0.70	0.75	0.85	0.90	1.10	1.30	
13														
14														

DUPLIX ZONE INTERURBAN TICKET USED BY ROME ELECTRIC RAILWAY & TRAMWAY COMPANY

payment cars now in operation all over the North American Continent. Such a plan is fair to the public in that it tends to keep the average short ride in the center of the city at the minimum fare while it puts an increased burden on passengers going or coming from the suburbs. It thus encourages the short haul which seems by far the most profitable and makes the long haul fairly and honestly pay for itself.

As for the forms of checks submitted by Mr. Moir, they do not seem to differ at all from the usual British pattern as supplied, for example, by the Auto-Ticket Company, Ltd., of Liverpool or by Whiting & Sons of London, from either of whom anyone interested could probably obtain very interesting catalogs and literature amply dealing with this matter.

Finally, the zone-punch ticket system requires a great deal of checking and accounting, a thing which by no means can be overlooked in the United States, where people seem to be rather busy and accountants, therefore, do not happen to be lying round the streets.

As of possible interest some tickets employed in and about Rome are shown. The largest is a form of duplex ticket, which is used on the interurban line of the Rome Electric Railways & Tramways Company, and is a real terror to the passengers, the conductors and the cashier's accountants. The right-hand side of this ticket is a stub retained in the book issued to the conductor,



and these stubs are checked by the accounting department. The second illustration shows a commuter's ticket used on the Rome Municipal Railway. This card is carried by the commuter in an identification booklet bearing his perforated photograph and his and the manager's signatures. For single fares on the Rome municipal lines, the straight fare is in force, and half of the net earnings go to the employees on a very modern and efficient profit-sharing plan.

I hope that, if perchance Mr. Moir should read this article, he will excuse somebody living much farther than himself from the United States for not sharing his opinions about zones and all their blessings.

## Safety-Car Operation in Seattle

### Traffic Jumps on Capital Hill Line—Two New Lines Operated with Interpolated One-Man Cars

**S**AFETY-CAR operation on the Summit Avenue line in Seattle, which began in 1915, has given officials of the Puget Sound Traction, Light & Power Company a good idea of how these cars handle traffic.

The data given in Table I were compiled to show how the safety cars on this line fitted into the traffic schedule, what was the loading time and what percentage of the traffic they carried. The data, which were considered to be typical, were taken between 4 p.m. and 6 p.m. on July 17. The point of observation was on Third Avenue near Pike Street, before the diversion of cars which turn off Pike Street.

The power consumption on one of the Summit Avenue safety cars, equipped with G. E. motors, was 1.51 kw.-hr. per car-mile, averaged over 4626 car-miles. In considering this power consumption it should be noted that there is practically no level track on the Summit Avenue line. The grades are as follows:

2400 ft. of 3.4 per cent grade
1000 ft. of 4.5 per cent grade
600 ft. of 6.8 per cent grade
600 ft. of 6.0 per cent grade
300 ft. of 8.0 per cent grade
Remainder, from 1 per cent to 2.5 per cent

The length of the round-trip route is 4.89 miles. For the most part it runs through a residential and apartment-house district, averaging about nine stops of 6.6 seconds duration for each car-mile. The schedule speed, covering layovers, varies from 7.4 to 6.1 m.p.h.

On Aug. 5, 1918, as noted in the *ELECTRIC RAILWAY JOURNAL* of Sept. 28, 1918, the company interpolated five one-man cars over the densely settled portion of

TABLE I—ONE-MAN OPERATION ON SUMMIT AVENUE LINE IN SEATTLE ON JULY 17, 1918

	Two-Man Cars	Summit Line Safety Cars	Total
Number of cars operated.....	103*	17	120
Per cent of total.....	86	14	100
Actual average headway (minutes).....	1.2	7	1
Headway for thirty minutes at Third Avenue and Pike Street (minutes).....	0.9	4.0	0.9
Headway for thirty minutes at Third Avenue and Union Street (minutes—scheduled).....			0.75
Number of passengers carried.....	6,298	649	6,947
Per cent of total.....	90.6	9.4	100.0
Passengers per car.....	61	38	58
†Loading time per passenger (seconds).....	2.49**	3.02	
†Loading time per car (seconds).....	30.7	22.7	
†Passengers loaded per car.....	12.3	7.5	

\* This represents the total number of cars operating on six different lines approximately seventeen on each line.

\*\* A front-end collector was on hand to help with two-man cars, but rendered no assistance to the one-man cars. The apparently excessive loading time of both types of cars was due to the crowded condition of the platforms, which interfered with the boarding passengers.

† These last three items were the results of observations covering a portion of the period mentioned (4 p.m. to 6 p.m.) on two successive days.

TABLE II. OPERATING CONDITIONS ON TWO NEW ONE-MAN CAR LINES IN SEATTLE

#### 1. Kinnear Park Line:

	Two-Man Cars	One-Man Cars	Total
Number of cars scheduled.....	*123	16	139
Per cent of total.....	88.5	11.5	100
Average scheduled headway.....	1 Min.	7.5 Min.	52 Sec.
Number of passengers carried.....	4,936	299	5,235
Per cent of total.....	94.3	5.7	100
Passengers per car.....	51	19	47

Length of round trip, one-man cars, 4.2 miles.  
Scheduled speed, including layover time, 6.6 m.p.h.  
Scheduled speed, not including layover time, 7.2 m.p.h.  
One-man cars on Kinnear Line alternate with through two-man cars.

	A.M.	M.	P.M.
Headway previous to one-man operation.....	7	8	6
Headway with one-man operation.....	3½	4½	3½

#### 2. Broadway Line:

Scheduled speed, including layover time, 6.6 m.p.h.  
One-man cars alternate with through two-man cars.

	A.M.	M.	P.M.
Headway previous to one-man operation.....	7	7½	4
Headway with one-man operation.....	4½	4½	3

NOTE—Number of cars scheduled northbound on First Avenue at Pike Street between 4 p.m. and 6 p.m. on week days.

\* This includes eight different lines.

† Excluding Alki and Fauntleroy cars—practically empty at this time.

the Capital Hill line. It is interesting to note that about eight weeks after the installation a general traffic check showed that this line had gained 11 per cent in traffic while other lines during the same period showed a gain of only 4 per cent. It is believed that this increase, in large measure, represents passengers who traveled in private automobiles when car service was less frequent. The safety cars added 18 per cent to the car-hour total on the Capital Hill line.

Since the time when the Capital Hill one-man operation was begun, the company has installed one-man service on two additional lines running into the down-town district—the Kinnear Park line and the Broadway line. Data regarding operation on these two lines are given in Table II. Seattle now has four one-man car lines. On the Summit Avenue line operation is by one-man cars entirely, but on the other three lines one-man turn-back service is operated in connection with two-man through cars.

## Unusual Tramway Operation in Russia



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TRAMWAY CAR AT ARCHANGEL OPERATED BY AMERICAN SOLDIERS

**A** STREET car strike in Archangel, North Russia, the headquarters of the American North Russian expeditionary forces, caused the military authorities to press soldiers into service to restore order. A car operated by an American soldier is shown in the accompanying photograph, while in the crowd surrounding the car are two American bluejackets. This is one of the first United States official pictures from the American front in North Russia.



# Six Hundred Safety Cars in Sixty Cities

**New England Street Railway Club Is Told How Use of Safety Car Is Still Spreading Rapidly — Safety Cars Are Revenue Producers, Expense Cutters and Good Will Gainers**

**S**AFETY cars occupied the center of the stage at a meeting of the New England Street Railway Club in Boston, Mass., on Feb. 27. In introducing J. C. Thirlwall, consulting engineer General Electric Company, as the first speaker, President R. W. Perkins pointed out that the safety car offers the operating man an opportunity to regain the good graces of his patrons—something greatly needed at this time. Mr. Thirlwall said he could not refrain from recalling a prediction made in October, 1917, that the widespread use of the safety car was slated for early realization. About fifty Birney cars were in operation at that time in six cities, and data as to their service results were relatively few. Today more than 600 such cars are in service in more than sixty cities, ranging in size from towns of 20,000 population to towns of 400,000 like Seattle, and even Brooklyn, where certain lines are operated with safety car units.

A striking feature, Mr. Thirlwall said, is that the use of safety cars has spread rapidly after the initial installations. Thus, from one car at Seattle, three in Bellingham and two in Everett, Wash., thirty are now in order for Seattle, sixty for Tacoma, thirty for Bellingham and fourteen for Everett, with others adopted in Vancouver, Astoria, Aberdeen, and Portland, Ore. The most "historic" installation, that at Fort Worth, has been in service for three years, and all but one of the sizeable cities in Texas are using safety cars. This exception, San Antonio, apparently did not install the service properly, making the mistake of placing the cars too far away from the motorman and thus slowing down the schedule to a point which aroused popular disfavor.

The safety car is in use in about twenty cities of the Middle West. The East has been slower to take up the idea, but early installations at Plymouth, Mass., and Bangor, Me., are giving good service. Within the last two months large success has been attained in their use at Bridgeport, Conn. Brooklyn and Trenton are also falling into line.

According to Mr. Thirlwall, the success of the safety car now merely depends on the adaptability to a particular installation, the questions being how many lines should be equipped in this way, what lines are best suited to safety-car service and what sort of results may be expected.

## SAVINGS IN POWER AND MAINTENANCE

The reduction in power consumption is practically in proportion to the saving in weight in comparison with the older types of cars. Sixty per cent of the power bill is saved by the 13,000-lb. safety car, compared with the 40,000-lb. two-man car. This means that two safety cars can be run and power cost saved. Where three safety cars are run instead of two of the old type, the power bill is cut in half. Power costs today are terrific. On an exceptionally well-managed road the cost of producing power has risen in the last two years from 0.4 cent to 1.4 cents per kilowatt-hour. Power is to-day

costing the average small road nearer 2 cents per kilowatt-hour than the latter figure named. It is even more important than two years ago to use equipment which will best conserve power.

Regarding maintenance, Mr. Thirlwall said that the first twenty-five or thirty cars have been in service about three years. Some on the Pacific Coast has averaged 60,000 miles per year and have "stood up" as well as older cars in every detail of the equipment, including the safety features. Compared with the ordinary type of four-motor city car, the safety car will require not more than one-half the outlay as to maintenance for equal mileage. Even with a greater number of safety cars on a line the total maintenance cost may run less with these units. It is too early to draw specific conclusions as to the reduction of overhead and roadway maintenance by the use of safety cars.

Turning to the suitability of safety cars for New England, the speaker pointed out that the average wage is today not far from 45 cents per hour for motormen or conductors in that section, or 90 cents per hour per crew. Even by paying the operator of a one-man car 50 cents per hour there is accordingly a saving of 40 cents. Operating costs exceed 40 cents per car-mile in many cases, and receipts on some lines run as low as 15 to 20 cents. On a line earning 15 cents it would be hard to show a profit by the use of safety cars, but these would at least cut down the losses. Lines earning from 25 to 30 cents per car-mile in normal times could about pay their operating costs. By the use of safety cars such lines could probably in many cases be made profitable.

At Fort Worth the net increase in earnings by the use of thirty safety cars was \$78,000 per year, the car-mileage having been increased 20 per cent. To improved service was attributed \$60,000 increased revenue. At El Paso, in February, 1918, safety cars were placed on two lines, and 20 per cent more service was given. The receipts on these lines increased 37½ per cent, those of the other lines being unchanged. The power consumption was decreased 45 per cent, and twelve carmen were required for the lines in question instead of twenty-two. At Tacoma, Wash., thirty-two safety cars on three lines rendered 50 per cent increased service, reduced the platform labor from fifty to forty-two and increased the gross receipts 40 per cent. Ten of the safety cars on a Seattle line are now giving 55 per cent increased mileage and 67 per cent increased receipts, and require twenty-two carmen instead of twenty-nine. At Terre Haute, Ind., the power savings of twenty-two safety cars pay 12 per cent on their cost. At Everett, Wash., eighteen safety cars are being operated daily compared with a former rush-hour total of thirteen of the two-man type. In a four-months' period in 1918 compared with a like portion of 1917, the car-mileage rose 24 per cent and the receipts about 40 per cent. At the same rate per year, the use of these cars (fourteen new cars at \$6,000 each and four remodeled at \$4,000 each) would yield increased revenue



and operating economies sufficient to pay 75 per cent on the total safety car investment, and in a city of stationary population during the two periods under contrast.

Mr. Thirlwall said that with a car equipment maintenance cost of 4.5 cents per car-mile for an ordinary 20-ton car operated by two men, the maintenance cost of a Birney car would be about 1.5 cents; the power costs would be 6.5 and 2.7 cents respectively, and the crew wages, at 8 m.p.h. schedule speed, 11 and 6 cents respectively. Thus, power, maintenance and wages cost, through the substitution of one Birney car for one 20-ton two-man unit, would be reduced from 22 to 10.2 cents per car-mile. An all-day car making 8.5 m.p.h. and running eighteen hours daily would run 56,000 miles per year, with \$12,400 operating cost for a 20-ton car as compared with \$5,700 for a Birney car. If three Birney cars took the place of two two-man units, there would be an estimated saving of about \$3,800 in yearly operating expenses on the basis of each car displaced.

A car earning 80 cents per mile and running eighteen hours per day earns about \$16,800 per year. With Birney cars there should be obtained certainly 50 per cent increased service and 20 per cent more revenue, or \$3,300 additional, making a total net increase of \$7,000 per year per car displaced. On weaker lines, say with earnings of 20 cents per car-mile, the yearly revenue per car would be about \$11,200. Increased service with the safety car should bring \$2,200 more revenue, which, added to the \$3,800 saving in operation, would yield \$6,000 per car. The net increase in revenue and decrease in expenses for three safety cars on a former two-car four-man line would be \$12,000 to \$14,000 per year, and the safety cars would pay for themselves in from eighteen to twenty-four months. On light service lines a car-for-car replacement is generally desirable, but where shorter headways and increased speed would build up traffic better, a 40 to 50 per cent increase in units is good practice.

In closing, Mr. Thirlwall said he doubted the wisdom of buying new safety cars for tripper service, in view of the usefulness of remodeled units in the rush hours and on holidays. About 400 former two-man cars have been changed over so far. Answering inquiries, he said that in some cases it had become necessary to add another turnout where safety cars had been installed, but in others no changes were necessary. Where snow scrapers have been installed, safety cars have made good records even in severe winter weather. Data as to average power consumption, drawn from different roads, were as follows: In the southwest, something under 1 kw.-hr. per car-mile; in the north, in winter, 1.5 kw.-hr., and in summer, 0.9 kw.-hr. The point was brought out that the safety car will start more quickly than an automobile in traversing a railroad crossing at grade.

#### WHY SAFETY CARS SUCCEED

W. G. Kaylor, Westinghouse Traction & Brake Company, New York, N. Y., then read a paper describing how the safety air brake and control equipment work. Continuing he said in part:

So many things contribute to the success of the safety car that it is not only difficult to enumerate them but more difficult to discover them. For instance, increased earnings have been charged to more frequent and faster service and more comfortable riding, but there is another factor that affects the receipts. The collection and registering

of fares is performed in full view of all the passengers. This encourages honesty in the handling of the company's money. Passengers on a safety car are interested in everything that goes on. They watch the operator handle the car and the passengers getting on and off. If there is a delay they know why the car is held up. For that reason they do not kick about the service as they do on a two-man car where they cannot see what is taking place on the rear platform.

The higher schedule speed of the safety car has been charged to more rapid accelerating and braking, fewer stops, the quick opening and closing of the door and a higher free running speed, but there are other contributing factors. For instance, entrance at the front enables the operator to "spot" the car when bringing it to a stop so that no time is lost by the passenger walking half the length of the car to reach the door. This little detail also adds to the comfort of the passenger, particularly if the street is muddy and he is standing on a crossing.

The traffic officers like the safety car. They have no difficulty in seeing when the door is closed and the car ready to start.

There are many reasons why the men like to handle the safety car. There is no drudgery about it. It is simple and easy to operate. The one man is in sole charge of the car. It is his car. He is dividing responsibility with no one. He does not have to wait for the bell but starts when he is ready. He is kept comfortably busy all the time. This causes him to take more interest in his work. It keeps him alert and attentive to his job.

On a large eastern line where safety cars have been in service for about a month an interesting situation has developed. Some of the younger men are complaining that there is too much work to do and they wish they were back on their old cars. Upon investigation it has been found that this was propaganda on the part of the younger men to discourage the older men with seniority rights from bidding for safety-car runs.

When getting ready to start safety-car service it has been found that there is danger of too much importance being attached to newspaper publicity. There is no harm in a small amount of conservative publicity properly handled. If publicity is started too soon, however, there is danger of enthusiasm dying down and speculation arising before the cars are ready for service. The men get together and criticize the car before they know anything about it. On the other hand, if one gives them time to speculate, it is remarkable the number of objections the public can raise and the number of old laws they can discover prohibiting the operation of cars with one man.

A practical demonstration is the best possible publicity. When the cars are all ready and the men instructed—say a few days before the date set for starting safety-car service—invite the newspaper men for a ride around town in one of the new cars. The next day take out the Mayor and other public officials. Then start operation when enthusiasm is at its height. After the second day of operation all objections have faded away, the company is realizing the benefits of more economical operation and the public is pleased with the better service.

The uninitiated electric railway manager still finds it hard to believe all he reads and hears about the success of the safety car. He still clings to the old adage that they may be all right somewhere else but would never do on his line. His patrons would never stand for them. The grab handle is unsuitable, the platform too small, the aisle too narrow, etc. His final objection is that the standard safety car is not the last word in street cars. Maybe not—the inventor would be a greater genius than anyone has given him credit for being if that were the case. But why wait? Why hypothesize? Put them in service and then try to improve on them.

Maj. Gardner F. Wells, consulting engineer, New York City, was then called upon to give some observations upon the safety-car service instituted under his supervision at Bridgeport. Nine cars were put in operation on Feb. 2, 1919, on two of the "thinnest" lines in the city, where no jitney service existed. A five-minute headway was adopted in place of a former ten-minute headway, the length of line being 2.75 miles and the schedule speed 8.5 m.p.h., due principally to cars being held up by large cars and jitneys on Main Street. At the end of the first week's operation a 20 per cent increase in gross earnings was noted on these



lines, the other lines showing a slight decrease. The second week of operation showed 25.3 per cent increase in gross, with a slight decrease on other lines. For the first week the earnings per car mile were 22.5 cents, and for the second week 23.9 cents. In 1918, the Bridgeport division earned 31.62 cents per car-mile and the expenses were 28.47 cents. The Birney cars, which weigh 7 tons compared with 15 to 20 tons for the old equipment, have resulted in a reduction of the operating costs to practically half.

#### FAVORABLE RECEPTION IN BRIDGEPORT

J. W. Colton, publicity representative the Connecticut Company, described the results of operation in Bridgeport in remarks which follow in part:

Criticism of electric railway operation in Connecticut was most rabid in Bridgeport. This spirit of hostility, however, has almost entirely disappeared in the last two months in Bridgeport. The change of sentiment is due to several things, but much credit is due to the good service given by the safety cars and the feeling that more of these cars will be operated in Bridgeport. Persons who used to walk downtown or depend on automobiles, now go on the trolley car because it accelerates so rapidly and covers the ground so quickly that everybody seems to feel sure he will get to his destination speedily and conveniently. We have not yet heard a single complaint regarding the operation.

Thus far the safety cars in use have tended to create that which all electric railways most need—public good will. We are confident that when we have tried them out in Hartford and New Haven, where they will begin operating next week, the public will demand more of them. Safety cars are the best eliminators of criticism we have found, because the public is prone to complain more about slowness of service, long waits for cars and so-called minor deficiencies than about the big things that bother the railway men themselves. Anything that will create good will is extremely valuable to the railways at this time, and I would put the safety car at the top of the list of the good-will producers.

As far as preparing the public for safety-car operation is concerned, we gave car riders about a month's notice of the coming improvement. The cars were thoroughly described by means of news articles. When the operators were being trained, the newspapers were given items as to the progress. Three days before the cars went into actual service, advertisements were printed in all the papers to announce the new service, the advertising continuing through the Sunday on which the new service began. Several days before the service began, placards were put in the car windows on the two lines concerned and an additional sign, "Please Have Exact Change Ready for Your Fare," was placed in the cars. The new cars were run over the route without any passengers but on regular schedule on the day before their use. Consequently, everybody on the streets saw the cars, and everybody who read the newspapers knew the cars were to be operated. The result was that they began operation under the most favorable circumstances, all prejudice against them having been removed in advance.

Major Wells then read extracts from many letters from representatives of city governments as to their opinion of the success of the safety car in their communities. At Austin, Tex., "these cars are popular, enabling the railway to secure substantial savings in operation without impairing the service." El Paso, Tex., cites the "quick starting and easy stopping, and undivided responsibility secured by this greatest improvement in street car service for several years." Houston, Tex., reports the cars a success if not overcrowded.

Tampa, Fla., says that the people are on the whole pleased with safety cars, commends the safety devices and objects only to a few jerky starts and stops due apparently to careless handling. Kansas City, Mo., has safety cars on eleven lines; twenty-nine cars have been converted to "safeties," and twenty-five new

safety cars will soon be put on the system. Fort Worth reports a success in every way from the public point of view, the cars being "fast, quick in acceleration like a racing automobile." Tacoma, Wash., and Waco, Tex., cite the improvement in service, with noteworthy savings in operating expenses. At Bridgeport cases have arisen where automobile owners admit putting up their autos and patronizing the safety cars instead, and the service of this new rolling stock is giving the jitneys a hard run for their money.

Major Wells also presented the following notes and figures on the safety-car practice of some companies under Stone & Webster management:

While quite a number of Stone & Webster companies are operating safety cars, there are only two operating practically all one-man cars, at Bellingham and Everett, Wash. At Bellingham the equipment at present consists of twenty safety cars purchased new, eight safety cars built by the company, and eight two-man cars. The two-man cars are not all in use, however, an average of two being operated at the present time. The eight safety cars built by the company are similar to the Birney type, the only important difference being that the trucks are somewhat heavier than those ordinarily used. All but one of this company's lines are operated with safety cars, this line representing not much more than 10 per cent of the total operation.

The Everett company operates fourteen lightweight safety cars, seven rebuilt one-man cars and two two-man cars. The seven rebuilt cars are considerably heavier than the ordinary safety car, having been made over from single-truck closed cars originally operated with two men. All but one line of this company are operated with one-man cars, this line representing about 7 per cent of the total operation.

In both cities interurban cars operate within the city limits over tracks of the local company, but the expense of operating these cars is not included in the figures given in the accompanying table except so far as maintenance of track and overhead would be affected by this operation.

The power expenses per kilowatt-hour, it will be noted, are somewhat higher for Everett than for Bellingham. This is due to the fact that the former purchases practically all of its energy, while Bellingham generates more than half of its energy by water-power and purchases almost all of the remainder at a low rate.

As far as the question of depreciation is concerned, no definite data are had at the present time, but it is assumed in various estimates that one can count on a life of about fifteen years for safety cars. These cars cost about \$6,000, which works out on the straight line basis to \$400 per year depreciation. On an assumed yearly mileage per car owned of 40,000, this gives 1 cent per car mile. Interest at 8 per cent would give an amount of 1.2 cent per car mile additional.

DATA ON BELLINGHAM AND EVERETT SAFETY CAR SERVICE

	Cents per Car-Mile 1918	
	Bellingham	Everett
Way and structures .....	1.44	1.82
Equipment* .....	1.20	1.03
Power .....	0.85	1.33
Conducting transportation .....		6.84
Traffic .....	0.01	0.20
General and miscellaneous.....	3.02	3.72
Total expense .....	13.10	14.99

\*Not including I. C. C. depreciation charge.

A brief discussion followed the presentation of the foregoing data. It was pointed out by C. C. Pierce, General Electric Company, Boston, that the traffic load-factor is improved by safety cars installed on a higher ratio than 1 to 1. Merchandising transportation through increased service is the great need of the day. It was stated that 26-in. wheels are used in New England safety car practice, and this helps to maintain service under snowy conditions. It was also said that within three months about twenty-five safety cars will be in service on the Philadelphia Rapid Transit System.



# Beating the Strikers at Kansas City

Third Strike in Sixteen Months Caused Replacement of Practically  
the Entire Organization—Domination of Outside Labor  
Agitators Completely Broken

**M**ANY items concerning the recent strike of employees of the Kansas City (Mo.) Railways have been appearing in *ELECTRIC RAILWAY JOURNAL*. Because of the unique situation, however, a review with additional information concerning certain developments should be of interest to all electric railway operators.

On Aug. 16, 1917, after a strike lasting eight days, the Kansas City Railways recognized the Amalgamated Association of Street & Electric Railway Employees and entered into a contract for one year. In March, 1918, the men went on a sympathetic strike with the laundry workers' unions for five days. Some employees who had never joined the Amalgamated and others who placed their loyalty to the company above unionism refused to strike. These men banded together and in April, 1918, formed the Kansas City Railways Employees' Brotherhood.

## PURPOSE OF LOCAL BROTHERHOOD

The constitution of this brotherhood states that the employees are able to manage and take care of their own affairs and to look after their own interests without interference, advice or dictation by any individual or foreign organization, and that their employment is of a quasi-public nature which is too necessary for the public welfare to be interrupted by strikes of any nature whatsoever.

Active membership in this organization is limited to the following classes:

1. White employees permanently employed. Office employees, officials or those acting in a supervisory capacity shall not be eligible for membership except as honorary members.
2. Persons who do not belong to any other labor organization and who voluntarily express themselves in entire agreement with the principles of the brotherhood without any mental reservations. Applications for membership must be indorsed by the membership committee, and the members must be elected at a regular meeting by a majority of those present and voting.
3. The privileges of honorary membership may be extended to any officials and employees who subscribe to the constitution and whose applications are indorsed and voted upon in the same manner. Such honorary members have no vote and may only be heard by previous invitation or by majority consent.

The association is unalterably pledged to the principle that it is not to affiliate with or become a member of any other labor organization. Members joining any other labor organization forfeit their membership. The affairs of the association in its dealings with the Kansas City Railways are to be conducted wholly through its own officers or committees without aid, advice or interference from persons who are not members. The association is committed to the settlement of all difficulties with the company by conciliation and friendly arbitration.

Members of the brotherhood grew in number to 500 for all departments. They held sick and accident in-

surance paying \$15 a week and paid a total of \$1.75 a month dues. Meetings were held every two weeks in a local hall.

## HOW THE WAGE QUESTION AROSE

When the time came for the renewal of the contract with the Amalgamated Association, Aug. 17, 1918, the company voluntarily offered an increase in wages of 5 cents an hour, amounting to \$560,000 out of the \$1,000,000 expected to result from the increase in fares from 5 cents to 6 cents. The increase placed the scale at 30 to 38 cents. The employees refused to accept the offer, and the matter went to the National War Labor Board subject to the famous articles of submission in part as follows:

It is agreed by and between Division No. 764 of the Amalgamated Association of Street and Electric Railway Employees of America and the Kansas City Railways that the matter of wages and schedules shall be placed before the National War Labor Board for adjustment, subject to the general financial condition of said company and its financial ability under present revenues or any future increases allowed, pursuant to action or recommendation of the War Labor Board or otherwise to pay any wage increase which may be granted.

The decision of the War Labor Board shall be in force for one year from the expiration of the present contract, Aug. 17, 1918, to Aug. 17, 1919, and under the conditions herein set forth to be valid and binding upon the Kansas City Railways and the said association and all the members thereof."

This agreement, made on Aug. 17, 1918, was signed for the company by P. J. Kealy, president, and for the Amalgamated Association, Division No. 764, by E. F. Machael, president, and Sam Wallace, Allan Nelson, J. S. Smithey and W. H. Miles, wage committee.

The War Labor Board on Oct. 24 granted an increase to from 43 cents to 48 cents. In handing down the decision, however, the board noted its conditional aspect in the following words:

Under the agreement of submission between the company and its employees, this award is made conditional upon the granting of an increase in the rate of fare to be charged per passenger by the company and subject to the financial ability of the company to meet the requirements of the award.

The wage increase amounted to \$1,300,000 a year over the increase offered by the company and, if paid without a further increase in fares, would have resulted in a deficit of \$1,600,000.

Immediately the railway filed a petition in the Federal Court asking an injunction to restrain the States of Kansas and Missouri, the two Kansas Cities and the two Public Utility Commissions from interfering with the collection of an 8-cent fare which the company declared necessary to pay the award of the board. The company also asked for a construction of the award of the board. On Dec. 3 the court denied the injunction, declaring that the award of the board was not mandatory.



The company then appealed to the United States Supreme Court and to the Public Utility Commissions of Kansas and Missouri. The appeal to the Supreme Court, it is said, was dismissed at the suggestion of the employees, and the Missouri commission refused to take action because its jurisdiction was then in question. During this period an intensive advertising campaign to gain public support for the 8-cent fare and to secure higher wages for the employees was being simultaneously carried on.

### OUTSIDE AGITATORS STIR UP TROUBLE

About this time some outside labor leaders appeared on the scene and befogged the issue by making the employees believe that the award of the board was unconditional. A union committee met with President

Kealy on Dec. 9 and discussed the action to date. President Kealy told the committee that the company could not pay the increase in wages until an increase in fare was obtained, and it was decided the committee should call on the Mayor to seek city support for an increased fare. Instead of doing this the employees belonging to the Amalgamated Association met on the night of Dec. 10 and voted to strike at 4 o'clock the next morning. No notice from the association was given to the company.

Through some loyal employees the company was at once notified of the action. A large half-page advertisement, entitled "A Strike Against the Community," was inserted in the morning papers. This advertisement featured the special strike clause included in the contract which the company had with the Amalgamated Association, as follows:

In consideration of this agreement the members of the association hereby agree that they recognize that it is their duty to the public to furnish continuous and uninterrupted service, and to this end they shall under no circumstances cause any interruption of this service, and that there shall be no strikes, lockouts or concerted cessation of work for any cause during the entire term of this contract, and should any question arise that cannot be amicably settled, it will be arbitrated as provided in Section 1.

President Kealy wired W. D. Mahon, president of the Amalgamated Association, that the men had broken their contract and demanded that the contract be lived up to.

### STRIKE FAILED AFTER TWO DAYS

Approximately 1800 men walked out on the morning of Dec. 11, leaving the entire system paralyzed. The power house remained shut down for about twelve hours, and then some of the employees belonging to the Employees' Brotherhood resumed partial service. The Mayor, the police commissioner, the city member of the Board of Control, the Employers' Association and other public organizations took a firm stand and offered assistance to the company. Representatives from the Department of Labor were denied a conference with the Mayor, who said that as the men did not consult him when they struck in the night they need not consult him when they were looking for a "sled to ride out on."

The cars remained in the carhouses until Dec. 13, when at 7 a.m. the Brotherhood men began the operation of sixty-nine cars and continued this operation between the hours of 7 a.m. and 5.30 p.m. until Dec. 28, gradually increasing the number of cars as new men were accepted for employment and trained. Two policemen were assigned to each car and police patrolled the division points, as considerable disorder accompanied the beginning of service.

From the beginning the company had about 400 applications a day, having wired advertisements to newspapers in St. Louis, Chicago, Denver, Omaha, Des Moines and other cities in the Middle West. Strike breakers were not imported and no business was done with any strike-breaking organizations, it being felt that the class of men so furnished were generally not desirable. Any men who came in from outside sources were put through the regular employment routine and given permanent employment. About 600 soldiers and sailors were employed.

At the beginning a bonus of \$5 a day for the transportation department was paid over and above the regular wages. The bonus for the power-house, track, and shop employees was \$2 a day, it being assumed

## THE WORDS BEHIND THE DYNAMITE

### Labor Temple Speeches in the Afternoon DYNAMITE OUTRAGES THAT NIGHT

#### THE CAUSE

The following are extracts from speeches made from the platform at Labor Temple each afternoon to the men who left the service of this company.

"We've got to get busy and let the world know there's a strike on here." "You all know the snow is melting and in every alley you pass you see those little bricks, each one saying, 'Why don't you take me?'"

"I still believe this strike will be won in the field, not in the Labor Temple. From the noise of the police car whistles and the reports of accidents in the morning papers, some one is waking up."

"It is a good thing to have an alibi."

"I want to urge you to stick, and above all things, go out tonight and some way, somehow, keep the people off the cars. You know the Yanks did not win the war by sitting in the trenches, so my last word is to get busy."

"Go home and go straight to bed because if you stay up you might do something that would cause these people to stay off the cars and might cause to do that because it might win your strike for you. Well, get busy when you leave here."

"Several men were arrested last night, but they kept their mouths shut and got out this morning. I want you to keep up your good work. This case can't be won in Washington any more than the Yanks whipped the Kaiser. They didn't whip him in Washington. From now on, these meetings will start at 1 and will not last as long, as I want you to go out and get busy."

"Keep the good work going on, but always have an alibi where you are."

"Now in case you don't see us here for a little while in the future, don't think we have forgotten you. We have a movement on hand—I don't care to tell what, but in case you see some of us some time in some place we don't belong, don't recognize us, but beat it—get me? Now when you get out of here go home and go straight to bed. If you do not you might throw an alley apple through a car."

"I always said that a man's head was given him to make a living first and to protect his job next. I want to see a lot of scabs with bandages around their jaw, in the near future."

"I wired back to O'Shea all O. K.—that we had had more action here in the last 24 hours than was taken in the last two weeks."

#### THE EFFECT

The nights following the meetings in which these speeches were made, murderers sneak from their homes to waiting automobiles. They carry with them bombs made of brass tubing, filled with dynamite with explosive caps at one end. These are placed in switches or attached to the rail.

It makes no difference to them that the approaching car may be filled with helpless women and children—that they may be injured or killed, the innocent victims of Bolshevik lawlessness.

They care nothing for human life as long as they are able to carry on their anarchistic attacks against the law-abiding citizens of Kansas City.

Bombs have been thrown against car barns, in one case injuring four office employees.

Men have been shot at on the cars.

Bricks have been hurled through car windows.

These cowardly assassins take no chances of coming out in the open. Their crimes are not committed in the hot heat of anger, but are carefully and maliciously planned in cold blood.

These crimes are not isolated cases. They are not the work of individuals, but are the results of a carefully laid, well planned and well financed conspiracy against the property of this company and the lives of its employees and the passengers upon its cars.

These men are plentifully supplied with dynamite caps and the bombs are made by men who understand the use of explosives.

They are supplied with automobiles to carry them to the points of operation and assure a safe escape.

No sane man for a second will say that there is not a direct connection between the speeches made at Labor Temple and the perpetration of the most dastardly crime known to the courts—the placing of explosives to endanger the lives of innocent persons.

There have been over forty instances of these attempts made since the 21st of December.

The company asks the assistance of every law-abiding citizen of Kansas City in its efforts to apprehend these criminals. We ask every man to be on the alert. IF SUSPICIOUS CHARACTERS ARE SEEN AT NIGHT ON OUR TRACKS, TELEPHONE THE POLICE and if possible, with the assistance of neighbors capture the outlaws on the spot. The possession of explosives is a crime and the government will prosecute to the extent of its power. YOUR WIFE OR SISTER MAY BE A VICTIM—DON'T WAIT FOR THE POLICE BUT TAKE THE LAW INTO YOUR OWN HANDS WITH ALL FORCE NECESSARY.

A REWARD OF ONE THOUSAND DOLLARS will be paid for any information which will lead to the arrest and conviction of any person placing explosives in, near or upon the property of this company. The name of the informant will be kept in confidence.

THE KANSAS CITY RAILWAYS COMPANY

Philip J. Kealy, President.

January 17, 1919.

SHOWING THE PUBLIC THE REASONS FOR DYNAMITE OUTRAGES IN KANSAS CITY



that the platform men were placed in more dangerous positions. The shops did not begin active work until a week after the beginning of the strike, owing to the fact that all available shop and even office employees were drafted into platform and instruction work.

On Dec. 16 the company notified the men that if they did not return to work at once they would lose their seniority rights. Forty or fifty came back, tore up their union cards and threw away their buttons, although the company announced that no discrimination would be made against any man because of any union affiliation.

There was little violence during the early part of the strike because the Federal Court issued an injunction restraining the strikers and their leaders from interfering with the operation of the cars and prohibiting picketing and loitering about the property of the company. Moreover, the Seventh Regiment of the Missouri National Guard was placed on duty patrolling the lines with motor cars containing four men each with fixed bayonets.

On Dec. 18 a committee including the Mayor, the city counselor, two representatives of the Amalgamated

miting, were arrested by the government and confessed, dynamite being found, it is said, in the division headquarters of the local Amalgamated Association. Five other arrests for dynamiting were made later, all the men pleading guilty.

The average number of cars injured so seriously by collision as to be useless until repaired was for some time about two a day, although as many as eleven cars were turned in in one day.

Early in January another conference was held at which the company informed the strikers that employees could belong to any union they desired without discrimination being shown by the company, and that the company would agree not to hire additional women conductors, but that it would never sign another contract with any union and would not permit the wearing of union buttons.

The strikers then appealed to the War Labor Board to reopen the case, asserting that the company had not been diligent in an effort to increase fares. The city counselor and the Mayor appealed to the board not to reopen the case, but it assumed jurisdiction and set Jan.



TYPICAL APPEARANCE OF KANSAS CITY CARS AFTER DYNAMITING

Association, two of the Brotherhood, President Kealy, the president of the local Chamber of Commerce, the president of the Employers' Association, the representative of the National Department of Labor and one public-spirited citizen met and unanimously adopted the following resolution, which the company has followed:

That the company take back all old employees with clean records whose places have not been filled and that preference in immediate employment be given all old men with clean records whose places have not been filled.

Late in December the strikers realized that they were losing out as the Mayor, all commercial and public bodies and President Kealy refused any further attempts at arbitration. The company continued to hire men at the rate of more than 100 a day, and car service was gradually increased. Then dynamiting began outside company offices and carhouses.

Many cars were dynamited, causing much damage to equipment and buildings and injuring many persons. In Kansas City, Kan., platform men were sworn in as deputy sheriffs. Some strikers were shot. The outrages continued until four strikers, leaders in the dyna-

14 as the date of hearing at Washington if the strikers would immediately return to work in a body. The company refused to accept them except in accordance with the resolution previously adopted, and furthermore contended that the board had no further jurisdiction.

On Feb. 3 the board ordered that the company take all strikers back and that the previous wage increase award should become effective as of Jan. 5 without condition. By this time the company had employed more than 2000 new men and had the building up of an entirely new organization well in hand. It therefore refused to comply with the order.

As far as the company is concerned the strike is now over. The strikers still hold their daily meetings but are losing interest. In spite of the fact that the Amalgamated Association guarantees them \$5 a week after the first two weeks, they had on Feb. 15, it is said, received a total of only \$15 each.

The company is still hiring a few men every day to replace those who do not prove satisfactory. It is believed that the domination of outside labor agitators has been broken at Kansas City.



# Distribution of Materials and Supplies

**Great Opportunities for Economy Lie in Improved Methods of Distribution and Proper Use of the Storeroom — If a Reduction in Total Stock Required Can Be Effected, It Means an Unnecessary Investment Saved**

By B. J. YUNGBLUTH

General Storekeeper for Receivers, Pittsburgh Railways

**W**HILE the war was in progress it was imperative to anticipate long in advance the materials required for maintenance and operation. Because deliveries were so uncertain, it was necessary to carry much larger stocks of all standard materials and supplies, with the result that, disregarding the increased prices of materials, investments in materials and supplies increased probably 50 per cent. If to this is added an increase of approximately 75 per cent in the cost of materials, the amount of money tied up, as compared with the pre-war period, increased approximately 125 per cent. While prices will probably recede slowly, manufacturing conditions should soon be such that it will be unnecessary to look so far in advance. Prompt deliveries being obtainable, stock balances ought to be considerably decreased. It is time to trim sails.

## SUPPLY SUFFICIENT FOR REQUIREMENTS

Even now, when the financial condition of some, or I might say all, companies is a matter of grave concern, the managements are undoubtedly prepared to supply for maintenance and operation the materials and supplies that are necessary. But can you blame them if they are unwilling to provide more than will suffice? It should be borne in mind that prices now are abnormally high and apparently on the decline, and each day, week, or month that the purchase of additional supplies is deferred will probably mean that less need be paid. May we not assume, then, that the problem is so to distribute what is on hand or must be purchased, that none of the many different groups of men working at shops, track repairs, stations, offices, etc., may be inconvenienced by lack of any material? This means that we must be particularly careful that no one group of men has more than is necessary for immediate requirements, for if the total available supply is sufficient to meet the requirements of the property as a whole, an over-supply at some points would mean privation at others.

## LEARN FROM WAR REGULATIONS

Everyone is familiar with the activities of the food, fuel and railroad administrations set up by the government shortly after the United States entered the war for the purpose of properly distributing, during that abnormal time, the amount of food, fuel and transportation available, so that each industry and each individual might secure what was really necessary but no more. Perhaps most of us will remember the activities best by the recollection of the regulation of the supply of sugar. Now that it is all over and the inconvenience somewhat removed, I think we will agree that each of us received all the sugar that was necessary, even

though it came to us in small packages quite frequently, instead of in large quantities every once in a while. During that period hoarding, as will be remembered, was discouraged, because had there been any hoarding many of us would have been without a supply a great part of the time. Perhaps we can learn from these experiences many things that, in so far as they affect materials and supplies, can be adapted to electric railway operation.

All men like to be surrounded by as much material of the kind they are using as they can get hold of, and while it is in demand it occupies a place uppermost in their minds, but as soon as they have no further need, it ceases to engage their attention. Consequently they seldom think to send the surplus back to the distributing point so that someone else may be benefited. When there is talk on a railway property about economic shortage of materials and complaint that work is held up in consequence, it will rarely be found that the company is unwilling or unable to remedy an actual scarcity of material. Instead, it will usually be found that the system of distribution is at fault.

## TENDENCY OF FOREMAN TO ACCUMULATE MATERIAL

The distribution of material on a railway is based upon requisitions made by the foreman in charge of the activities at each of the hundreds of points on the property. If each of the foremen has no guide but his desires and no specific instructions, no constant supervision on the ground or no scrutiny of his requests for replenishing his supplies, it will be found in nine cases out of ten that he has more material than is absolutely required.

It is not uncommon to encounter the fellow who feels that all of the material of the kind that he uses, even though he is the only person who employs it, should be piled up at the end of his bench or somewhere in his particular department, and he therefore draws from the storehouse all that is available. The next time he needs some, he is surprised to find that, since there is no apparent demand, the storekeeper is unprepared to supply him. The storehouse records must reflect the demand for material not in a spasmodic way but from day to day so that a supply to replenish the stock may be ordered at the proper time.

Aside from material of such a nature that it must be held in stock for infrequent uses or for possible breakdowns, it would be uneconomical to stock quantities of material for which there is no continual demand. On account of rapid changes in types of equipment and adoption of improved practices, one must always be watchful of items that are gradually becoming obsolete, so that when a change is made there may be a minimum stock and no unnecessary loss.



Before a foreman can make an intelligent requisition he must know the probable volume to be used, the quantities he has on hand and those that are still due him on previous requests. Such information should be shown for each item on the requisition. To assist him it is necessary to establish some sort of schedule so that he will know on what dates requisitions should be prepared and on what dates delivery will be made, with the additional privilege, in case of necessity, of procuring special deliveries without too much formality. Given this information, he should be held to strict accountability for the stock of material he has on hand, and this can only be done by frequent inspection right on the ground.

#### APPROVAL OF REQUISITIONS OFTEN PERFUNCTORY

It is probably true in the majority of cases that persons having the duty of approving requisitions, because they come in an unceasing stream, delegate such work to subordinates who frequently do not have sufficient knowledge to pass upon the requests so that, in the absence of occasional checks, the approval becomes altogether perfunctory. I have known men engaged to pass on requisitions who have thought it their duty to reduce practically all items requested by 50 per cent, thinking that was the way to regulate the amount of material furnished, forgetting that their job was not to cut down the amount of material but to furnish what was required and not a whole lot more. An occasional intelligent question asked by the approving officer of the requisitioner makes him careful to exercise much more judgment in preparing requisitions.

Usually when quantities of material are allowed to accumulate where work is in progress, the place gets in a rather untidy condition with the result that when a piece is needed it is easier to go to the storehouse for it than to locate it in a pit or elsewhere.

The shops which the writer has visited having the best reputation as producers were conspicuously the ones that had the decks cleared for action like a battleship. It is vitally necessary that from each of these points all materials in excess of those required for current use should be returned to one point, the storehouse, which acts as a reservoir to keep the supply lines filled.

It may be acknowledged that men do the best they know how, and if not told to the contrary, they will assume that the way they follow is the best way known by their superiors. The whole condition is one demanding enlightenment.

#### WORN-OUT EQUIPMENT SHOULD BE RETURNED

During the war a great deal of apparatus had to be scrapped because it was impossible to get it repaired on account of the scarcity of shop labor. Now that the labor situation is so rapidly improving, it will be possible to undertake much of this work, and the repaired equipment can be turned in to the storehouse to reduce purchases. The volume of material required for stock is appreciably cut down if certain goods are handled on an exchange basis, that is to say, if the company requires the delivery of an old piece every time a new one is delivered. Included in the

items so handled might be placed journal bearings, field coils, armatures, trolley poles, trolley catchers, headlights, tools and many similar pieces of apparatus capable of being promptly repaired, turned into stock and reissued.

Articles have appeared in recent periodicals describing the savings made by the reclamation section of our army in France. Is our need less?

#### HOW TO CONDUCT A "PICK UP" CAMPAIGN

Winter will soon be over and spring housecleaning time will be upon us. For the past ten years our company has conducted periodical "pick up" campaigns which have been nothing more nor less than a systematic housecleaning of the whole property. Those will understand what I mean who have moved occasionally and found in the attic and in the cellar articles of furniture or household use that had been placed there intended for some possible future use. Perhaps it was a baby carriage, and the baby had grown to be ten years old, or perhaps an old phonograph or an old heater, all of which were promptly discarded rather than moved to the new home.

We form a committee of the storekeeper, division superintendent, track supervisor and division master mechanic, and they, with a gang of men, visit every shop, office, station or other point where material is used and go into each corner from cellar to attic. It is determined right on the ground what is useless at that particular point, and such items are loaded up and taken back to the storehouse. They might be simply surplus stock, material not required at that point on account of a change in the equipment operating from there, or they may be obsolete because of change in design. By far the larger percentage of all the material thus collected is good and capable of being used elsewhere. The rest of it may be scrap for which ready market is always found.

When the plan was started, considerable opposition developed until the nature of the work was understood. But when the local officials learned that they were not to be deprived of anything they required, they welcomed the idea, realizing that we were helping them to do things they themselves should have done but were prevented by lack of time or by not conceiving the idea. They also knew that as their immediate superior was along and helped to determine what should be taken, they would be relieved of adverse criticism for not keeping enough material on hand.

It was not unusual for us to pick up from \$10,000 to \$15,000 worth of materials on such trips. On trips soon after the scheme had been started many items were gathered that had been unnecessary or obsolete for five years or more. There is a double incentive for making a "pick up" campaign this spring.

#### NEEDS SHOULD BE CAREFULLY ANTICIPATED

When a job is contemplated which requires extraordinary quantities of material or materials not usually carried in stock, it is well to make up a "bill of material" and not attempt to proceed with the work before sufficient stock is available to avoid interruption. Furthermore, before arrangements are made for the purchase of such materials, it is well to be reasonably sure



that the proposition will hold water and be prosecuted to a finish. Everywhere one finds that plans are made involving the use of considerable material purchased for the purpose which fall flat for various reasons and the result is that materials unsuitable for other purposes remain on hand, usually involving a total or very considerable loss.

Why not concentrate the responsibility for the stocks of unapplied materials for the property as a whole, regardless of where they are located? Give the officer in charge corresponding authority and the full co-operation of the management, have him sign all requisitions for materials to be purchased as assurance that such materials are not available from some other portion of the property so as to avoid purchase, and look to him for results?

## Appreciation Means Much

**Suggestions as to How the Efficiency of the Work Done on an Electric Railway Property Can Be Increased**

BY EDW. C. SPRING

Superintendent of Transportation, Lehigh Valley Transit Company, Allentown, Pa.

"Render to Cæsar the things that are Cæsar's and to God the things that are God's."—Mark xii, 17.

**N**O MAN lives unto himself alone, neither does any business these days. We are prone to forget and lose sight of the deeds of others, to forge ahead expecting results to follow in our path without first paving the way for efficient work. We are not willing to give credit where credit is due, to recognize the ability of those that make up our organization and encourage them by our appreciation of their meritorious acts.

Appreciation and encouragement are vital essentials that help make efficiency in service. Where there is the chief of a department whom the chief executive of a railway company cannot or will not encourage, the department should have a new chief.

The secret of co-operation in large undertakings lies in the appreciation of service from the managerial head. The manager of a large industry is placed there for his ability to encourage his subordinates to the highest degree of efficiency.

It is universally admitted that the successful man is the one who can get the most out of his subordinates. This is considered to be the basic requirement of any executive.

A splendid example of this was in the placing of Charles M. Schwab as director general of the Emergency Fleet Corporation. Mr. Schwab's great success lies in the encouragement of others, by showing his appreciation of service rendered by others. He is a co-worker with all, from chief assistant to clerks.

"No man ever worked for me in my lifetime, but many thousand men have worked with me, and that is what I want you men to do. We in Washington do not deserve the credit for this," said Schwab, addressing the Camden clans who put the *Tuckahoe* over in record-breaking time, "it is the management here. It is the foreman on the ship, the foreman under the ship and the workmen in all parts of the ship that deserve the public credit for what they have done here, and I shall be the one to see that they get it. The people are winning the war. God please, you workmen have your

hearts as full of patriotism as mine, and to hell with the Kaiser every time you drive a rivet."

Mr. Schwab keeps his wholesome humanity at all times. Always a democratic person, it is largely this trait that has put him at the head of the country's greatest steel industry.

Appreciation costs little but accomplishes much; it is the vital asset to great results.

We are living in an era when much must be accomplished by the little and what we lose by diminution of our ranks must be met by speeding up on the part of the others. It is a time when the seemingly impossible must be accomplished, when heads are called upon to meet conditions which are entirely new and which must be worked out in the quickest possible time. Power and equipment increase, and difficult transportation problems, not to speak of the grave financial difficulties attendant upon high costs and insufficient revenues, are all potent factors which must be met and solved with the greatest dispatch and accuracy.

This calls for the combined efficiency of the entire organization, necessitates that each man must be made to believe in his individual importance in speeding up production. He must be encouraged and spurred to the fullest action that his highest efficiency may be given to the work to be done. A word of appreciation to an employee will bring about a hundredfold in results. It is appealing to the man's human side, and when you do this you hit the vital spot in his make-up.

Are we doing our part in our various organizations in speeding up to meet and keep apace with the great commercial activities of the hour?

We have run our properties too much like unto a machine with each employee as a necessary cog in the wheel, without regard to his possibilities. Let us give the needed encouragement, and then we will have added greater efficiency and, what is more, can also demand it.

The air is full of encouragement, encouragement to our boys who have so nobly represented our country overseas. The great generals in the World War have realized the imperative need of the fighting element being keyed to the highest possible point in the life of the soldier. To this end the award of medals for bravery and distinguished service has been made so that it has been the highest ambition of every man in the service to obtain one of these coveted prizes. The foreign nations have always set us an excellent example in this respect.

Heads of industrial concerns have offered bonuses in the form of stocks in the company, together with promotions to stimulate the personnel of their organizations. All of this is along the right lines. The more closely you keep the employee in touch with his company, the sooner he will feel his part in the big game, and where he has a personal interest, say as a stockholder, you can more forcibly put home to him the economic side of the operation. It is wrong for us to class our employees as machines, what we want are real human beings with red blood, who can think and act quickly, ready to meet and cope with any emergency.

A large proportion of the electrical industries of the country have not looked far enough into the future of their properties in the encouragement and appreciation of the work of their employees. We are being called upon to-day, as during the war, to develop and produce



ways and means for power, light and transportation to meet the abnormal demands of the country, to carry to completion problems of enormous magnitude. To bring about the best results in our individual work, we must give the encouragement and the appreciation to others which rightfully belong to them. This will incite to greater efforts and is creative of that most valuable business asset, loyalty, which builds up a spirit of team-play in any business force.

Begin now to appreciate others, and the results which every manager is looking for will surely follow.

Watch the results of this business efficiency and feel the effect upon yourself, as you observe the new light break upon one in your employ who has needed that little word of encouragement to develop those talents most necessary to your interests.

There may not be much in the things that you say—it's the way that you say them;

The kind of games that you play doesn't count, it's the way you play them.

In palace or cottage, in office or ditch or wherever you're working,

The test of your manhood is answering this, Are you striving or shirking?

And Life at the best only gives back again to you that which you gave it;

So high life or low life means nothing at all—it's the way that you live it.

## LETTER TO THE EDITORS

### A Subscriber for Thirty-Five Years Renews

NEW YORK CITY, Feb. 24, 1919.

To the Editors:

I have been interested in the energetic efforts the *ELECTRIC RAILWAY JOURNAL* has recently made in spreading the work you are doing in keeping up and increasing its circulation, and while such efforts will doubtless prove profitable to its owners, it will also serve its purpose in keeping all who are directly or indirectly connected with street surface and interurban railways unusually well informed on all subjects so important to those interests.

In looking back I recall the encouragement I gave to the undertaking of the *STREET RAILWAY JOURNAL* (the prior title of your publication); I felt it would accomplish just such beneficial results as it certainly has done, upon which it gives me great pleasure to congratulate you and your able staff as well as those of your predecessors.

If my recollection is correct, the first issue of the *STREET RAILWAY JOURNAL* contained the obituary of my honored father who had served the Brooklyn City Railway Company as its secretary in the early age of street railways, and who died in October, 1884. The notice and his picture appeared on the front page of that issue.

I very distinctly remember, as an operator of horse and electric railways, your journal furnished me a serviceable implement in the progress of my work.

As a manufacturer of railway supplies, it served me as an important factor in enlarging that business.

As a broker, in the placing of full issues of public utility securities and arranging loans on such securities, it proved of value, keeping me in close touch with

the rapid and many developments and operations in this important field.

I trust the response to your efforts will be handsomely rewarded by a substantial increase in subscribers, and that your journal may continue to lead in usefulness as it has for so many years in so ably presenting to its readers all matters affecting the interests and welfare of electric railways.

Inclosed find check in renewal of my thirty-sixth yearly subscription.

DANIEL F. LEWIS.

## AMERICAN ASSOCIATION NEWS

### Mid-Year Meeting Announcements

A CHANGE has been made in one of the speakers for the annual dinner of the American Electric Railway Association on March 14. Senator Harding, who was scheduled for an address, will be unable to be present and in his stead the committee has secured an acceptance as a speaker of Francis Burton Harrison, governor-general of the Philippine Islands.

The dinner for the ladies at the mid-year meeting will be served in the East room at the Waldorf-Astoria at 7 p.m. The charge will be \$5 a plate and applications for dinner tickets should be sent at the earliest possible moment to the offices of the association. As mentioned in the program published last week, before the speaking in the main Banquet Hall begins, the ladies will be conducted to seats in the gallery boxes, and at the termination of the dinner, an informal dance will take place in the Astor Gallery, adjoining the main ball room. Mrs. J. H. Pardee will head the list of patronesses, assisted by the following ladies: Mrs. R. M. Campbell, Mrs. E. D. Kilburn, Mrs. N. M. Garland, Mrs. E. N. Chilson, Mrs. E. S. Fassett, Mrs. J. J. Sinclair, Mrs. W. P. White, Mrs. George Keegan, Mrs. C. R. Ellicott.

### Information for Company Section Members

PRESIDENT L. S. STORRS of the Connecticut Company has supplied to the members of the local company section, No. 7, some leaves for insertion in a loose-leaf notebook of pocket size containing information regarding the company and the electric railway industry. This first instalment is headed "Bulletin No. 1," is dated March 1, 1919, and is introduced with the following words:

"It is of the utmost importance that you should be familiar with every important fact of public interest concerning the Connecticut Company. For that reason you are asked to read carefully the slips which are sent you for insertion in the loose-leaf binder which was sent you some time ago. This information is for the purpose of making it possible for you to acquaint the public, when occasion requires, with our condition and the causes of it. If you have need of additional information, do not hesitate to call upon me for it."

Following are the sections comprising Bulletin No. 1: Present-day conditions; control of Connecticut Company; financial standing of company; burdens placed upon company; the jitney question; abandonments, receivership and foreclosures; fundamental causes of breakdown of industry; increased cost of material; care of property; importance of service, and question of fares to be charged.



# News of the Electric Railways

FINANCIAL AND CORPORATE • TRAFFIC AND TRANSPORTATION

PERSONAL MENTION

## Boston Committee Reports

### Mayor Peters' Committee Recommends That Subway Rentals Be Continued and Dividends Reduced

A committee named by Mayor Peters of Boston, Mass., to investigate various financial questions associated with the operation of the Boston Elevated Railway recently made a report recommending certain proper courses of procedure. The committee as originally appointed consisted of Alexander Whiteside, chairman; Louis K. Liggett, Greenville S. MacFarland, Michael J. O'Donnell, Bentley W. Warren, Charles F. Weed, and Dr. William C. Woodward. Subsequently Thomas F. Sullivan was added and recently Mr. Weed resigned and Edmund D. Codman was appointed in his place. The recommendations made by the committee are summarized below:

1. The trustees and the management should be allowed a fair chance to work out their problems without further legislative or other public action, except possibly in regard to the proposed purchase of the Cambridge Subway by the State and the elimination or reduction of dividends to common stockholders of the Boston Elevated Railway and to stockholders of the leased West End Street Railway.

2. No staggering of hours should be attempted.

3. A careful study should be made by the trustees and by the Boston Transit Department of plans to relieve congestion at Park Street and other important points, special attention being given to the advisability of building a subway from Boylston Street to Post Office Square.

4. A careful study should be made by the trustees and the management of means to reduce the evils involved in stealing fares.

5. The present 8-cent fare should be continued unless and until a satisfactory and workable zone system can be established.

6. The system should not be operated under public control except as at present by the trustees, and a careful study should be made of the advantages and disadvantages of public ownership.

7. The State should purchase that part of the Cambridge Subway now owned by the company, but it should carefully consider whether the rental should not be 42 per cent of the purchase price instead of 43 per cent.

8. The company should not be relieved of the obligation to pay subway rentals.

9. Until the company can be operated profitably, no dividends should be paid to Boston Elevated common stockholders or to West End preferred or common stockholders.

Messrs. O'Donnell, Sullivan, Whiteside and Woodward favored the last two recommendations, but Mr. Warren dissented and also from the part of the first one that related to the elimination of dividends. In a separate report he recommended the following substitutes for the sections dissented from:

1. The persons using the Boston Elevated Railway facilities should be relieved, during the period of public control, from all taxes, and all paving and street maintenance obligations, imposed by law upon the facilities of the company which are devoted to transportation, and also from a part certainly, and perhaps from all, of the expense of removing snow and ice from the highways.

2. It is wise public policy to postpone the consideration of the proposal to relieve the car-riders of the burden of paying the subway rentals during the period of public control, until the next session of the Legislature when the results of a full year's operation under that public control will be known and both the Legislature and the city will be better able to deal in an intelligent way with the question.

## Rapid Transit Proposal Made

### Cleveland Considers Asking Voters to Appropriate Money for Initial Rapid Transit Line

At a meeting of the Rapid Transit Commission of Cleveland, Ohio, with Fielder Sanders, Street Railway Commissioner, on March 3, the question of submitting a bond issue to a vote of the electors on Nov. 4 was discussed. The funds from the proposed issue would be used for the construction of the first unit of the rapid transit subway under the Public Square.

#### SUBWAY TERMINAL SUGGESTIONS

M. M. Brinckerhoff, of Barclay Parsons & Klapp, who are making a survey of traffic conditions preliminary to recommending plans, outlined suggestions for a subway terminal and stated that the plans will be completed by May 1. This terminal will have five units, all arranged to make a complete whole, but the construction of only one at a time will be undertaken. Decision as to which shall be undertaken first will depend upon conditions at the time.

It is probable that the first bond issue will be for \$5,000,000. As the work progresses other issues will be authorized, but the idea of the commission now is to build the terminal and short radiating lines which will relieve the congestion in the streets in the downtown retail and wholesale sections.

Mr. Brinckerhoff gave the locations of entrances to the subway terminal and said the tracks would be placed 28 ft. below the surface. Details of construction will depend somewhat upon the final decision as to building a union passenger station on the Public Square, as has been planned. Arrangements will be made for an underground entrance to that building, if it is constructed.

#### MUNICIPAL OWNERSHIP RESOLUTION

At a meeting of the City Council on March 3 the resolution prepared by Mayor Harry L. Davis, arranging for the submission of the municipal ownership question to a vote of the electors, was referred to Director of Law Fitzgerald for revision. It is said the wording of the resolution may convey the idea that Council is committed to municipal ownership. The members do not care to create that impression at this time.

## City Threatens Competition

### Detroit Street Railway Commission Wants \$10,000,000 for Initial Experiment in Municipal Ownership

The Street Railway Commission of Detroit, Mich., the Mayor and the members of the City Council met in executive session recently to go over the railway situation again in the light of the recent developments with respect to the commission's purchase proposal to the Detroit United Railway, the company's counter leasing proposal and the rejection of this last by the city. At the conclusion of the joint meeting it was announced that the Council had been asked to pass an ordinance amending the city charter in such a manner as to permit of the issuance of \$10,000,000 of bonds to be rated as public utility bonds outside of the 4 per cent limit imposed by the new charter. This authorization will require submission to the electorate at the April election in the form of a charter amendment.

Two members of the commission have been delegated to map out a system of municipal lines with a view to presenting a plan to the commission soon.

The official communication from the Street Railway Commission to the Common Council contained this reference to the construction of municipal lines as the solution:

The railway company having rejected what we considered to be a fair and honest price for the property it appears to us that the course which the city should now pursue is the acquisition of a railway system by construction and by purchase of roadbed where franchises have expired. Accordingly we believe that at the April election a proposition authorizing the issuance of public utility bonds to an amount not to exceed \$10,000,000 for the acquiring of a railway system should be submitted to the voters of this city. We believe that such an amount will permit the city to improve the transportation facilities greatly and, in time, allow us to make the city system exclusive.

The plan which we propose to your honorable body in the form of an ordinance has been made sufficiently broad to permit the city's making use, in part, of subway or elevated types of railway should such action be deemed advisable. Obviously, no routes could be specified in the brief time which the commission has had to prepare this measure, but it is our intention to plan immediately for the building of new railway lines in territory not now served as well as over territory now traversed by the Detroit United Railway on which its franchise rights have lapsed.

In consideration of this ordinance we will be pleased to supply your honorable body with all of the data and information of which we are in possession. Our earnest desire is to proceed with all possible sincerity on a course that we believe will end for all time the difficulties which have hampered the development of the city for many years.

It seems, however, that the field is not to be left entirely to the electric railway. There is a counter proposal that the city shall put its money into motor-bus lines.



## Terms of London Strike Settlement

### British Observer Reviews Peculiar and Interesting Features of a Strike that a Little Sagacity by Labor Might Have Prevented

In the beginning of February the whole of the great system of underground electric railways in London, England (with a minor exception under separate management), were paralyzed for a week by a strike of the employees. This was the first time in their history that such a stoppage had occurred. The inconvenience to the public was enormous, as the tramways and the motor omnibuses were quite unable to cope with the traffic thrown upon them. In the mornings business was disorganized through people being late in arriving at work; in the evenings the public were much delayed in getting home. Enormous numbers had to walk.

#### NO WARNING OF TROUBLE

The trouble began with little or no notice on the morning of Feb. 3 when the motormen refused duty because their half-hour interval for a mid-day meal was not to be counted part of their newly established eight-hour day. The men employed in the Chelsea power station, which supplies the underground railways, also knocked off, and for the first time in its existence that great establishment was motionless.

Never during their existence had the London tramways ever done such a business. The creditable nature of their performance and of the work of the management is the greater when one remembers the necessarily imperfect maintenance of track and rolling stock during the war and the shortage of employees. Perhaps even greater were the difficulties faced by the London General Omnibus Company, as it serves, among other areas, those not provided with tramways.

The strike lasted for a week, the service on the underground railways being resumed to a certain extent on the afternoon of Feb. 9, and more fully on Feb. 10 and following days.

#### CONDITIONS ON UNDERGROUND LINES

The conditions of work on the underground railways are different from those on the main steam lines, as the services are comparatively local, the men are never far from home, and there is no goods nor mineral traffic. In connection not only with the motormen, but the men on night shift carrying out running repairs on the trains, the agreement entered into after the general railway strike of 1911 (which only partially affected the London underground railways) when the scheme of conciliation boards was put into operation, was such that the length of the shift was reckoned at from nine to nine and one-half hours, inclusive of a short relief time for meals. Payment was at so much per shift, and in the event of overtime being worked the rate per hour was calculated as though there had been no relief time in the shift. That is to say, in the case of a nine-hour shift the rate per hour was reck-

oned at one-ninth of the amount received for the full shift. There should thus be no misapprehension as to the fact that meal times were paid for.

In August, 1917, a large section of the railway employees of the country made a demand for an eight-hour day. The government then as now was in control of the railways. It refused the request, but promised that a claim for a shorter working day if put forward immediately after the close of hostilities in the war would have sympathetic consideration. In consequence of this promise the principle of an eight-hour day for all members of the wages staff and the railways was conceded in December last. The government contended that what was granted was an eight-hour working day exclusive of meal times, and this apparently suited the existing conditions on the main line railways of the country, but not on the London local railway. The eight-hour day came into operation on Feb. 1, with a provision that all outstanding points and the methods of application were to be settled afterwards by conference between the trade unions, the Railway Executive Committee (which manages all the railways of the country under government control) and the government.

#### THE MEN'S POINT OF VIEW

Anger arising from personal inconvenience and dislocation of business rather blinded the public to the underground man's point of view, and certainly little prominence was given to it in the newspapers. No doubt it was unjustifiable to cause so much trouble and loss over a comparatively trifling subject, but on the other hand, the underground men felt that, while an advantage was being given to main-line men under the eight-hours scheme, what was given to them with one hand was being taken away with the other. There are two trade unions connected with British railway service, the National Union of Railwaymen, which has much the larger membership, and the Associated Society of Locomotive Engineers and Firemen, the members of which consider themselves the elite of the profession. The fact that there are two unions to deal with instead of one and that there is much jealousy and rivalry between them adds greatly to the troubles of the railway companies. When the A. S. L. E. called its men out on strike on Feb. 3 people were puzzled, in view of an agreement which had been signed on Jan. 30. The union based its demand on the previous agreement made between the two unions and the government on Dec. 6 last which was as follows:

1. An eight-hour day for all railwaymen to be put into operation from Feb. 1, 1919.
2. All other conditions to remain as at present.

When it came near the time for application conferences were held on Jan.

29 between the president of the Board of Trade (representing the government), the railway executive committee and representatives of two trade unions. As a result the parties on Jan. 30 signed the following agreement:

The principle of the eight-hour day for railwaymen is to be given effect to as from Feb. 1 on the basis of existing conditions of service, and where it is not found practicable to reduce the working hours to eight, overtime to be paid for all time worked after the expiration of eight working hours. In calculating the eight hours, time allotted for meals will not be counted in cases where time has hitherto been so allotted; for example:

1. A man hitherto booked on at 6 a.m. and working continuously until 4 p.m. will, if booked on at 6 a.m., cease working at 2 p.m., or if he works later will be paid at overtime rate from 2 p.m.

2. A man hitherto booked on at 6 a.m. and working until 5 p.m. with a meal hour between (say) 12 noon and 1 p.m., will, if booked on at 6 a.m., cease working at 3 p.m. (with an hour's meal interval), or if he works later will be paid at overtime rate from 3 p.m.

Where a man's work has been arranged on a weekly basis overtime will be paid after forty-eight hours work; and as regards allotted meal times the principle set out in example No. 2 will apply, i. e., allotted meal times will not be counted in calculating working hours.

The above is without prejudice to the right of either side to claim different arrangements and the negotiations now pending.

Very possibly it was the case that the trade union representatives in signing this agreement had not in mind the peculiar conditions of the London underground service but were thinking only of the conditions on British railways generally which would not be so adversely affected. The total number of men employed on the London lines is, of course, small, compared with the number engaged on British railways generally. At all events the underground motormen got up in arms and the A. S. L. E. executive supported them. They declared, by referring to the agreement of Dec. 6, that the government had been guilty of a breach of faith.

#### UNCERTAINTIES

The wording of the original circular notices to the men was vague. The men assumed that the principle of the eight-hour day having been accepted, and all the other conditions being to remain in force, the eight-hour day was to include meal time (usually half an hour) in the same way as the nine or nine and one-half-hour day did. The agreement of Jan. 30 was considered as only applicable to the steam lines of the country on which goods and mineral traffic has to be dealt with. In fact it hardly seems conceivable that if the point had been directly brought before the secretaries of the two trade unions they would have agreed to a stoppage of pay for meal time on the underground railways.

The matter was further complicated by the fact that the agreement of Jan. 30 was not in the hands of the railway companies until Jan. 31, and that it was well known to the men that duty sheets had been drawn up on the basis of eight hours inclusive of meal time. The circular (for which the railway executive committee was responsible) stating that the eight-hour day meant eight hours work exclusive of meal time



came as a bomb-shell on the underground employees. The motormen struck and so the N. U. R. men were thrown out of work, including the power station and workshop hands.

It seems pretty certain that the railway executive committee was afraid to grant anywhere an eight-hour day inclusive of meal time, even where meal time had previously been included and paid for in the shift, for fear the granting of it in one case would prejudice the position of the main line railway companies in their negotiations with the trade unions which began on Feb. 12 and were expected to last some time. In these negotiations payment for meal times on all railways is one of the points brought forward by the unions. The difference between the conditions on the London Underground Railways, which operate a vast frequent passenger service mainly in tunnel, and those on main line railways where relief periods cannot be arranged for short times, makes it difficult to think that trouble would be experienced on the main lines through the granting of a concession to the underground employees corresponding to that which they enjoyed for the last six years.

#### THE SETTLEMENT

The trouble of having to deal with two trade unions was made conspicuous in the settlement of the dispute. As the result of negotiations the Board of Trade, the Railway Executive Committee and the A. S. L. E. on Feb. 6 came to an agreement the essential point of which was:

Meal time will not be included in the eight hours, but in the new conditions of the eight-hour day the companies will offer all reasonable facilities to meet the ordinary physical needs of the man.

This, like the previous agreements seems somewhat ambiguous, but it was adopted as a temporary arrangement pending the approaching consideration of the general conditions of service. When the public expected a resumption of the traffic on this solution being adopted, they were disappointed, as the N. U. R., which had previously condemned the strike, came on the scene, refused to accept the arrangement, and declared a strike of their men. Another conference was set agoing, with the result that early on the morning of Feb. 8 the N. U. R. executive agreed to exactly the same terms as those already accepted by the A. S. L. E. The additional provision secured was, however, that, pending the completion of new duty sheets, a man should be nominated for each railway to assist the companies in seeing to the proper carrying out of the arrangements for securing reasonable facilities to meet the ordinary physical needs of the men, which facilities are to be included in the eight-hour day.

The whole matter is a story of cross-purposes and the details may be instructive to railway employers and employed in America. Seeing that complete negotiations on every outstanding question were near at hand, a little patience would have saved all the trouble.

## Promoting Better Labor Relations

**Public Service Adopts Collective Bargaining—Increases Life Insurance, Sick Benefits and Pensions**

The Public Service Railway, Newark, N. J., as briefly announced in last week's issue, has accepted the principle of collective bargaining approved by the National War Labor Board. All questions which arise between employer and employees are to be settled by giving the employees equal voice and vote in making adjustments, with ultimate arbitration if necessary.

In brief, the operation of the collective bargaining plan includes the creation first of branch committees representing the respective carhouses, shops or stations, to which the employees will elect two representatives and the company appoint two. These branch committees will form department committees. The members of each department committee for employees will elect two members to constitute a general committee, and the company will appoint an equal number of representatives for a like purpose. Thus, any question arising will be taken up by the proper branch committee at the point of origin and adjusted there or carried to the higher committees. Arbitration by disinterested persons is available when necessary, the Board of Public Utility Commissioners being the third arbitrator if one cannot be agreed upon by the arbitrators chosen by the two sections of the general committee.

Membership in the new Co-operative League will be voluntary and not restricted by union affiliations. No initiation fee will be required, but there will be dues of 50 cents a month. Permanent employees who receive less than \$2,500 yearly compensation will be eligible for membership. Each member will be entitled to receive a Prudential Insurance Company life insurance certificate for \$1,000, in his name, issued under the group plan. Should a member in good standing leave the service of the company he will be entitled to continue personally the \$1,000 insurance, without medical examination, at rates based on the insured's then attained age. Or, in the case of total and permanent disability occurring before the member reaches sixty years of age from causes arising after the issuance of insurance, the \$1,000 will be payable in monthly or yearly installments to the holder of the certificate.

The Public Service Railway, under its former welfare plan, paid out from Jan. 1, 1911, to Jan. 1, 1919, a total of \$634,853 in sick benefits, life insurance and pensions. Under this plan, which it is proposed the Co-operative League shall supersede, \$300 death benefits and \$1 a day sick benefits were paid as compared to the \$1,000 insurance and \$2 a day sick benefits of the new plan.

Compensation for injuries will be paid as heretofore under the provisions of the workmen's compensation act. The minimum pension under the welfare plan was \$20 a month. The

company has raised the pension rate 50 per cent with a new minimum of \$30 a month.

The company will continue to bear the costs it has previously borne, and, in addition, will pay into the Co-operative League treasury more than one-half of the added cost, leaving the membership dues to make up less than half of the extra expense involved.

Acceptance or rejection of the combination collective bargaining and co-operative league plans proposed by the Public Service Railway is a question for the decision of the employees and this decision will be final. This is the position taken by the railway and outlined by its representative, John L. O'Toole.

## Toronto Buys Suburban Line

By the terms of an agreement arrived at between representatives of the city and the Toronto & York Radial Railway, Toronto, Ont., the city has arranged to purchase from the company for \$590,000 the Yonge Street section of the Metropolitan Railway lying between its southern terminus near Farnham Avenue and the city limits, together with certain rolling stock, and the company's rights and franchise in connection with this section.

In return the city agrees to allow the Toronto Railway to carry on its lines the package freight and express goods of the Metropolitan, and upon its acquisition of the Toronto Railway to furnish and operate cars for the carriage of such goods from the city limits to terminal stations which, the agreement provides, will be established by the York Radial Railway at St. Lawrence Market and other points within the city.

The agreement to purchase is the result of private negotiations carried through on behalf of the city by Works Commissioner Harris, Finance Commissioner Bradshaw and City Solicitor Johnston. It awaits the approval of the City Council and ratification by the Provincial Legislature before becoming operative.

## Mr. Starring in San Francisco

Mason B. Starring, president of the California Railway & Power Company, New York, N. Y., which controls the United Railroads, San Francisco, Cal., is in San Francisco in connection with the plans for the financial readjustment of the San Francisco company. He is reported to have said that the readjustment would in all likelihood be carried out on the plan made in September, 1916, and amended subsequently, providing for a reduction of the capitalization. With respect to the matter of the city taking over the lines of the company, Mr. Starring is reported to have said:

About a year ago there was much talk of the city of San Francisco taking over the United Railroads. The city engineer was instructed to make a valuation for the purpose. I may say that the United Railroads is willing to accept a reasonable offer if the city wishes to make one. I



believe that if the people of a city desire municipal ownership then municipal ownership is the right thing for such a city. I am absolutely in the dark as to the reason for the discontinuance of the plans for taking over the railroads. As I see the situation it is a matter between a willing buyer and a willing seller.

I do not believe it will be necessary to raise the fares on the San Francisco railroads, as has been done by traction companies in other cities. Though we have not paid dividends for several years, we are getting along on the 5-cent fares.

## Other Preparatory Steps

### Seattle Gradually Disposing of Details Standing in Way of Completion of Railway Purchase

A bill recently introduced in the Legislature at Olympia, Wash., by Representative Frank G. Myers of King County, offers protection for the deal made by the city of Seattle for the purchase of the railway lines of the Puget Sound Traction, Light & Power Company, the legality of which is now being tested in the Supreme Court. The measure validates utility bonds of cities and towns issued in the purchase of utilities, plants or systems. The bill provides:

Whenever a city or town has entered into such contracts and has agreed by ordinance to issue utility bonds in payment and has by ordinance created a special fund and obligated the municipality to set aside and pay into it moneys from the gross revenue of any municipal plant, then owned, including the property required, such contracts and ordinances are ratified, approved and validated to the fullest extent possible under the constitution of the State.

The corporate authorities of every city having such contract are empowered to consummate and perform all such ordinances, and contracts not yet fully completed.

The bill has been referred to the committee on municipal corporations of the first class.

A further move in the city of Seattle's purchase of the railway system of the Puget Sound Traction, Light & Power Company was recently made when the Council elected the Title Trust Company and the Washington Title Insurance Company to make the title search of the property involved.

## City's Purchase Right Upheld

In a seven to two decision filed on March 5 the State Supreme Court of Washington upheld the legality of the proposal of the city of Seattle to purchase the railway system of the Puget Sound Traction, Light & Power Company for \$15,000,000 in utility bonds. In anticipation of a favorable decision in the case both parties have gone ahead with the details. According to present plans the property will be delivered about April 1.

## New Office Quarters in Sherman

The Texas Electric Railway has leased the entire building at Travis and Lamar Streets in Sherman, Tex., the first floor of which is now occupied by the company as ticket office and baggage room. The second floor will be remodeled and refitted for offices. All trains between Dallas and Denison will be dispatched from Sherman. A clubroom for trainmen will also be provided.

# Utilities Are Facing Disaster

## Governors' and Mayors' Conference in Washington Recognizes Need of Electric Railway Industry

Problems of industry and labor, now confronting the country were discussed in Washington by officials of the government, Governors of the states and Mayors of large cities at a conference called by President Wilson on March 3, 4 and 5. The conference was formally opened by President Wilson, who urged that the federal, state and local governments work together "in steadying and easing and facilitating the whole labor processes of the United States."

A resolution embodying the principal ideas offered by the delegates to relieve the present condition was adopted. This included recommendations for a reduction of freight rates on all building material; for a change in the present method of demobilization of troops, for the releasing of natural resources of the country, and for government assistance in averting serious consequences in the financial affairs of electric railways.

### IMPERATIVE NEED OF UTILITIES

The critical aspects of the electric railway situation had again been brought to the attention of President Wilson. P. H. Gadsden, chairman of the committee on national relations of the American Electric Railway Association, on March 1 had sent to the White House a letter reading in part as follows:

The electric railways of this country are faced with disaster. Already sixty companies, operating in twenty-nine states and representing one-tenth of the total electric railway mileage of the United States, have gone into the hands of receivers. A compilation of the operating statements of three hundred and eighty-eight of these companies for the first six months of 1918 showed a decrease in net income of more than 80 per cent. Since that statement was compiled, the National War Labor Board has fixed a standard of wages for the industry which has added over \$100,000,000 to its already greatly increased operating expenses. Almost every other industry has prospered during the war, notwithstanding the increased cost of operations. The public utilities constitute practically the only exception to this rule of prosperity.

H. B. Weatherwax, president New York Electric Railway Association, had also sent to Governor Smith of New York a letter stating that the desperate condition of the electric railway industry constitutes one of the grave industrial and economic problems of the nation and more particularly of New York State. He urged the necessity of bringing this question up for discussion at the conference in Washington. A telegram to the same effect was sent to President Wilson.

The resulting action on the part of the conference in Washington was the following recommendation:

The attention of the conference has been called to conditions existing in many parts of the country with reference to electric railways. During the war increases in pay were granted to employees through the intervention of the federal government. Society recognized that the high cost of living justified this action in the fullest sense. These corporations, however, found themselves bound by certain limitations in the way of franchise contracts with municipalities, and while the operating cost has vastly increased in many instances, the rates of fare have continued without change. This is noticeably true in states where no

statutory provision has been made for an appeal to the state utilities commission. We disclaim any disposition to trespass on the rights of municipalities, but it is our earnest recommendation that the federal government continue its helpful offices with the view to averting serious consequences in the financial affairs of public utilities.

Eugene Meyer, Jr., managing director, War Finance Corporation, in the course of an address to the conference, made the following statement in regard to public utilities:

The public utilities are one of the big problems confronting us now. It is a problem of national importance from a financial and economic point of view because of the magnitude of the industry, and because it employs such a very large number of men it is a matter of interest to the Labor Department. Under normal conditions, the industry represents so much in the way of materials for maintenance, for track-laying in steel and iron, for lumber in the ties, for copper in the transmission wires, for motors, for machinery, for all kinds of building materials, that it cannot be ignored by you who are in local contact with it or by the national government from the national point of view. It represents an investment of thousands of millions of dollars.

Its credit, however, has been materially injured; its values have been materially impaired. While there have been in the past, no doubt, many examples of mismanagement, and it may be shown in some cases that difficulties are due to overcapitalization, nevertheless I can state that from our examination of cases presented to us, there are many instances where the difficulties arise from the economic influences which have been at work during the last four years, namely, constantly rising prices for materials and labor, combined with the difficulty of making adjustments to meet the changed conditions of costs.

I have no patent way of solving the problem. I think it would be inadvisable for anybody in Washington to seek to impose any solution in a local territory for a local question. I simply want to state, as one having had intimate contact with the problem, that I do consider that it is a big problem, and that this body should recognize it as a problem. Whatever the action of this conference may be on the subject, I think it can hardly afford to ignore the problem as a problem of national importance, though of local administration and local physical and financial control.

Is there anything that we in Washington can do? I am sure I can speak for Secretary Redfield as desiring to be helpful if called upon, and I know that Secretary Wilson is deeply interested, and Secretary Glass has manifested a disposition to recognize the problem as a problem of national interest. If there is anything, following the hint of the President, which you can suggest, you will find everybody here in Washington ready to do anything and everything within their power to help.

## Sounds a Warning

Moses Blau, chief of the State bureau of inspection and supervision of public offices in Ohio, has called the attention of the Cincinnati officials to the fact that the actual cost of an extensive undertaking, like the proposed rapid transit loop, is always far in excess of the original estimate, and that it will be well for them to take this into consideration in making plans for its construction.

Computing the cost of the improvement at \$12,000,000, instead of \$6,000,000 as estimated, Mr. Blau states that the interest on bonds and the redemption fund will call for an annual payment of \$726,000, unless the loop becomes self-sustaining at once. His opinion is given at this time in view of the unsettled condition of finances and the dubious problem of taxation.



## News Notes

**Would Heat Ohio Vestibules.**—A bill requiring electric railways to heat car vestibules at not less than 60 deg. Fahr. between Oct. 31 and April 15 has been passed by the House of Representatives of Ohio.

**Service-at-Cost Bill in Indiana.**—A bill providing that a public utility may enter into arrangements with a municipality or with its customers to furnish service at cost has been introduced into the Senate of Indiana.

**Women to Remain.**—No more women conductors will be engaged by the Kansas City (Mo.) Railways, but none of those now employed who wish to remain will be discharged. There are now fifty women on the cars. Their work is satisfactory and has been so from the start.

**Indictments Against Trenton Men Dismissed.**—The Court of Errors and Appeals of New Jersey has dismissed the indictments against Rankin Johnson, president of the Trenton & Mercer County Traction Corporation, Trenton, N. J., and eight other directors and officials of the company for alleged usurpation of the streets of Trenton.

**Storm Ties Up Traffic at Cincinnati.**—On the afternoon of Feb. 28 a heavy wind storm, accompanied by rain, tied up many of the railway lines in Cincinnati, Ohio, for several hours and demoralized light and telephone systems for even a longer period. Several of the towns on the river below Cincinnati were also without service for some time and operation was hindered at Dayton, Ohio.

**Wants Mexican Tramways Returned.**—According to advices from Mexico City transmitted by way of Washington, representatives of the Mexico City Tramways have been sent to Mexico City by Canadian capitalists, principal owners of the company, to urge President Carranza to restore the property to the owners. The tramway was seized in 1916 while a strike was on in the city, and the government said it was acting to protect the property.

**Public Control Act Pronounced Valid.**—The Boston (Mass.) Elevated Railway public control act, passed by the Legislature last year, is constitutional, in the opinion of Attorney-General Attwill, as given to the Massachusetts Senate in response to a request from that body. He is quoted as saying that the provision for public management has the same effect as if the Commonwealth had taken a direct lease of the system, agreeing to assume interest charges and operating expenses and to pay the corporation a rental.

**Accident Trial Started.**—The trial of T. F. Blewitt, division superintendent, and five other officers and employees of the Brooklyn (N.Y.) Rapid Transit Company was started in the Supreme Court at Mineola, Long Island, on March 3 before Justice Seeger, who was designated to preside at the trial when the indicted men succeeded in having their cases transferred from the Brooklyn district. All are accused of manslaughter in connection with the wreck on Nov. 1, of a train on the Brighton Beach line when ninety-five persons were killed and more than 200 injured.

**Not a Howling Success.**—Jersey City's municipal jitney line up Newark Avenue from Exchange Place to West Side Avenue is not proving profitable and Director of Revenue and Finance Gannon may decide to cut down the fare from 7 cents to 5 cents to provide keener competition with the Public Service Railway. When the line was opened last month the fare was fixed at 7 cents in order to provide competition with the electric railway, which now charges 7 cents. Some of the jitneys have already been taken off the line.

**Paying for Their Homes.**—Of the 800 men who started buying homes in the Kansas City (Mo.) Railways Building & Loan Association not one case has come up in which the need arose for foreclosure. Under the Missouri law a man has six months of lapsed payments before he can be foreclosed and no man has ever been obliged to let his payments drop for that long. There has been no surrender or rights or ownership by any striker who was buying. The interests of these men are being guarded in view of their possible return.

**Progress with Railway Brotherhood.**—The Brotherhood of Trainmen of the Kansas City (Mo.) Railways is becoming more and more popular with the employees. The membership now numbers more than 500. During the past two weeks sixty-six were added to the roll. The organization is entirely in the hands of the men. A motorman is its president. This brotherhood is modeled after the Denver plan. Each member pledges himself not to strike, but to arbitrate all differences which may come up between the employees and the company.

**Seattle Needs \$73,082.**—According to a report of A. H. Dimock, city engineer, the city of Seattle, Wash., is short \$73,082 in funds necessary for the completion of the municipal elevated railway. According to Engineer Dimock, cash paid to date totals \$312,000; due on contracts, \$36,000; bills not rendered and unfinished work, \$37,000; total, \$385,000. The total appropriation for the construction is \$311,917, leaving a deficit of \$73,082. The line in question, which has been under construction since last spring, extends from First Avenue South and Washington Street to the West Spokane Street bridge over the West Waterway. Just what action the city will take to secure the needed

funds has not been decided upon by the utilities committee of the Council. Street railway utility bonds in the sum of \$400,000 were offered for sale by the city recently, but no bids were received.

**Women Replaced in Cleveland.**—The forty women on the cars of the Cleveland (Ohio) Railway as conductors retired at midnight on Feb. 28, as specified in the decision of the National War Labor Board. It was reported that they would bring suit to retain their positions, but Miss Rose Moriority, who has guided them in their fight, said this would not be done, as it would probably bring about another strike. What the women do expect, however, is a decision of the National War Labor Board, defining their rights of employment in the industries. They believe this will be so broad that it will result in their reinstatement as conductors. The National Women's Trades Union League, Washington, is pushing the matter and it is hoped to have a ruling in the near future. They feel that women's right to work will be greatly extended.

**Review of San Francisco Municipal Railway.**—More than half of the annual report of the city engineer of San Francisco, Cal., to the Board of Supervisors, which will be printed in the near future, is devoted to a comprehensive historical and statistical review of the Municipal Railway development in that city. There will be included operating statistics for the year 1918, during which time the system carried 62,500,000 passengers, and a statement of extensions and new construction. A series of charts will be used to set forth the nature of the various contracts awarded, condition of funds, increase in extent of the system and the amount of gross and net receipts. There will also be a discussion of the desirability of unified control and management of a city's street railway system and a review of the progress of the plan for purchasing the United Railroads, with which the municipal line is in competition.

## Programs of Meetings

### New England Street Railway Club

The annual banquet of the New England Street Railway Club will be held in Boston on the evening of March 27. It is hoped that the principal speakers will be Senator Watson of Indiana and Charles M. Schwab.

### Wisconsin Electrical Association

The eleventh annual convention of the Wisconsin Electrical Association will be held at the Hotel Pfister, Milwaukee, Wis., on March 26 and 27. An attractive program has been arranged. It will be announced later. Following the established custom, a joint session will be held with the Wisconsin Gas Association on March 26. The gas association opens its convention on March 25.



# Financial and Corporate

## Record Figures for Dublin

Increased Costs Were Overcome by  
Higher Fares and Traffic  
Gain of 4,384,000

The Dublin (Ireland) United Tramways had record receipts and expenditures for the year ended Dec. 31, 1918. The receipts gained £91,218 over 1917, while the expenditures rose £69,982 in spite of the deferment of some renewal expenses and the incidence of high wages for only a portion of the last year.

As to the items making up the large expenses of £310,946, it may be explained that the coal bill, even on a rationed supply of coal, reached £38,906—an increase of £8,580, while the whole cost of the power-station operation, amounting to £47,106, showed an increase of £10,634. The total power station operation as late as 1912 amounted to only £21,279, which was exceeded last year by £25,827—an increase of 120 per cent in six years.

The total maintenance showed an increase of £30,542. This addition was mostly in wages, as there was so little new material available to spend money on. The company spent £28,145 in maintaining the track, though only a few new rails out of a small stock in hand were put into the road.

### HIGHER FARES HELPED

If the tramway receipts had not been increased, the company would have been in a serious position, for the bare working cost for 1918 was at the rate of 11.13d. per passenger car-mile, which did not include any provision for standing charges such as debenture interest, and the total receipts per mile in 1917 were at the rate of only 11.08d.

In April the company for the first time increased the fares, which had been in many instances below the statutory limit. The company was also greatly helped by the general increase in traffic, owing to the large spending power of the public. This was shown by the fact that notwithstanding the higher fares charged, the company carried a total of 71,008,655 passengers or 4,384,329 more than in 1917.

As to how far this tendency to increased passenger traffic is going to continue, W. M. Murphy, chairman of the board of directors, says he cannot venture to forecast an opinion; but he is afraid that people are living through a period of artificial prosperity which must necessarily be of a temporary character.

The net available at the end of the year amounted to £117,492, and dividends, bonus and reservations absorbed £104,230 of this, leaving £13,262 to be carried forward to 1919. The reserva-

tions included £15,000 for the general reserve and £35,000 for relaying of track and replacing of ten cars.

### SYSTEMS IN PRIVATE HANDS

The Dublin United Tramways is one of the few important systems in Great Britain and Ireland remaining in the hands of private owners. The Bristol Tramways are still in the hands of a company, but the purchase period—which expired at the beginning of the war—was postponed by act of Parliament owing to the difficulty of purchase in war times.

The London United Tramways, situated just outside the limits of the lines controlled by the city of London, is another undertaking of some magnitude in the hands of private owners. The finances of this company, however, have just been readjusted and its capital scaled down more than one-half.

A number of smaller undertakings still in private hands are being conducted with varying fortunes. Results of operation are very good in the manufacturing districts where large employment and high wages are to be had, but on the south and southeast coast the business from pleasure traffic is still poor on account of the air raids during the war.

## Would Defer Bond Interest to Make Improvements

A very difficult situation has arisen in Pittsburgh in connection with the receivership of the Pittsburgh Railways. Urged on by the city of Pittsburgh the receivers of the railway practically petitioned Judge C. P. Orr in the United States District Court for permission to forego paying fixed charges for bond interest during the present year and instead to put the money into betterments of service in the different communities which the railway serves. Thus the issue as directly raised by counsel for the city is the matter of choice by the court between the interests of the community and those whose money is invested in the railway. Judge Orr from the bench, interrupting counsel for the city, said:

The situation here is very troublesome, with its implication that these bondholders should receive nothing on the money they furnished to establish the company. You will never be able to get a dollar of future capital investment unless payments are made on these bonds. It is a horrible situation. I don't know where it is going to end. I am looking ahead to a time when the bondholders, coming together, will assert their rights. We cannot confiscate property without compensation.

On the other hand Special City Counsel Robinson, addressing the court, said:

The choice must now be made between the interests of the whole community and of returns to private capital.

## Anticipating Possible Default

Committees Formed of Security Holders  
of New York Company Which  
Apparently Faces Collapse

Announcement was made on Feb. 28 that, in view of the failure of the Interborough Rapid Transit Company, New York, N. Y., to declare the usual quarterly dividend and the consequent danger of a default on the interest due on April 1 on the Interborough-Metropolitan collateral trust 4½ per cent bonds, a bondholders' protective committee had been formed.

Later in the day it was announced that a committee also had been formed to protect the interests of the stockholders of the Interborough Consolidated Company, which is a holding corporation. The company has two classes of stock. The preferred consists of \$45,740,000 of 6 per cent non-cumulative shares of a par value of \$100. There are 932,626 shares of common stock outstanding without par value.

The bondholders' committee consists of six bankers. Grayson M. P. Murphy, senior vice-president of the Guaranty Trust Company, is chairman. The other members are John McHugh, C. A. Peabody, C. S. Sargent, Jr.; James A. Stillman and Frederick Strauss.

The stockholders' protective committee is headed by Eugene V. R. Thayer, president of the Chase National Bank. The other members are Chellis A. Austin, Harry Bronner, M. M. Buckner, Charles Hayden and Edwin S. Marston.

On behalf of the bondholders' committee Mr. Murphy issued this statement:

The committee has been formed not only to protect the interests of the securities that it represents but also to endeavor to assist in straightening out a situation which threatens a great number of investors and which may seriously affect the credit of the city and State.

The committee has no preconceived plans. A thorough investigation will be made at once, and the action of the committee will depend on the facts developed by that investigation.

With reference to the formation of the stockholders' committee the following announcement was made:

In view of the unsettled and unsatisfactory position of the local transportation lines for some months, and particularly in view of the public announcement of the possibility of default on the semi-annual interest due on April 1 upon the Interborough-Metropolitan collateral trust 4½ per cent bonds, for the protection of which a committee has been organized, it has been decided to have a similar committee in the interests of the holders of the preferred and common stock of the Interborough Consolidated Corporation.

Stockholders are requested to deposit their certificates with the Mercantile Trust & Deposit Company, New York, N. Y., which will issue the customary temporary receipts.

A deposit agreement is in course of preparation, copies of which may be obtained from the depositary as soon as completed. The secretary of the committee is Charles E. Makepeace, 115 Broadway, while Rushmore, Bisbee & Stern are its counsel.

Interest on the Interborough-Metropolitan Company's collateral trust bonds is guaranteed by the Interborough Consolidated Company. The income of the latter company is derived from dividends the Interborough Rapid Transit Company, the operating concern, pays on its stock.



## War Traffic Helps Richmond

**Railway Revenues of Virginia Company Jumped \$901,000 or 27.7 Per Cent—Expenses Up \$597,000**

The gross revenues of the Virginia Railway & Power Company, Richmond, Va., in both the railway and light departments, showed large gains for the fiscal year ended June 30, 1918. This was caused principally by the location of Camp Lee near Petersburg, the naval operating base at Norfolk and various other governmental activities in and around Richmond.

The gross operating revenues increased \$1,413,034 or 23.38 per cent. The larger part of the increase resulted from the operation of the railway department. The gross revenues

stock and the October, 1917, dividend of \$179,242 on the common stock, however, were paid. The surplus at the end of the year was \$1,270,776.

The revenue passengers in the year ended June 30, 1918, increased 12,838,418 to a total of 82,645,749, while the transfer and free passengers decreased 711,629 to 17,154,194. The average fare per passenger was 4.1 cents, a gain of 0.4 cent. The car-miles totaled 14,208,730, an increase of 661,086; and the car-hours 1,669,615, an increase of 51,400. The total revenue per car-mile amounted to 29.3 cents, a gain of 5.3 cents, and the operating expenses per car-mile 17.5 cents, an increase of 3.6 cents. The car-hour revenue was \$2.491, a gain of \$0.478, and the operating expenses \$1.486, an increase of \$0.322.

INCOME STATEMENT OF VIRGINIA RAILWAY & POWER COMPANY FOR YEARS ENDED JUNE 30, 1917 AND 1918

	1918		1917	
	Amount	Per Cent	Amount	Per Cent
Revenue from railway operations.....	\$4,158,594	55.76	\$3,256,791	53.88
Light, power and gas revenues.....	3,298,935	44.24	2,787,704	46.12
Total operating revenues.....	\$7,457,529	100.00	\$6,044,495	100.00
Railway operating expenses:				
Maintenance of way and structures.....	\$301,812	7.26	\$238,681	7.33
Maintenance of equipment.....	264,283	6.36	201,849	6.20
Traffic expenses.....	7,915	0.19	8,707	0.27
Transportation expenses.....	1,494,949	35.95	1,095,157	33.63
General expenses.....	411,487	9.89	338,294	10.38
Total.....	\$2,480,446	59.65	\$1,882,688	57.81
Light, power and gas expenses.....	1,620,046	49.11	1,058,604	37.97
Total operating expenses.....	\$4,100,492	54.98	\$2,941,293	48.66
Operating income.....	\$3,357,037	45.02	\$3,103,202	51.34
Other income.....	115,865	1.55	98,391	1.62
Gross income.....	\$3,472,902	46.57	\$3,201,593	52.96
Taxes and licenses.....	\$466,173	6.25	\$387,672	6.41
Interest, sinking fund and rentals.....	1,458,204	19.55	1,429,385	23.65
Discount on securities.....	30,316	0.41	30,315	0.49
Miscellaneous.....	89,762	1.20	162,133	2.69
Total.....	\$2,044,455	27.41	\$2,009,505	33.24
Net income.....	\$1,428,447	19.16	\$1,192,088	19.72

from this department gained \$901,803 or 27.7 per cent, the passenger gain amounting to most of this or \$857,057. The light, power and gas revenues advanced \$511,231 or 18.4 per cent.

The total operating expenses rose \$1,159,199 or 39.41 per cent, this increase being divided \$597,757 or 31.8 per cent for the railway department and \$561,441 or 53.0 per cent for the light, power and gas departments. As a result the income from operation gained only \$253,835 and the net income \$236,359.

In addition to the charges for maintenance of way and equipment, the sum of \$447,451 or 6 per cent of the gross revenues was credited to the reserve for depreciation and charged against surplus. The balance in the reserve as of June 30, 1918, was \$628,858. Capital expenditures for the year totaled \$444,438, of which \$256,745 was for the railway department.

On account of the necessity of making improvements and extensions to take care of war service demands, the directors decided it to be wise to conserve the cash resources. For that reason the dividend on the common stock, usually paid in April, was passed. Dividends of \$479,952 on the preferred

Chace, Providence, said he would not offer any objection to either Mr. Swan or Mr. Green.

Attorney Frederick W. Tillinghast stated that N. W. Smith, attorney for the New Haven Railroad, was unable to be present, but that he had been assured by him the New Haven road, which is a creditor of the Rhode Island Company in the sum of \$4,000,000 and in addition owns the entire capital stock of the Rhode Island Company, did not consider Mr. Green objectionable.

Attorney General Rice proposed the name of Zenas W. Bliss and no opposition was made.

John J. Fitzgerald, attorney for the carmen's union, stated that the three men named were favored by his clients. The carmen are vitally interested in the conduct of the Rhode Island Company, as at present there is a sum aggregating about \$150,000 due them for back wages, which was awarded by the War Labor Board but not paid as the company went into the receiver's hands before the second installment was due.

Attorney Tillinghast informed the court that he had drawn an order to be entered in the form of a decree, if satisfactory to the court, defining the powers of the receivers. It had the approval, he stated, of Clifford W. Whipple, attorney for the Rhode Island Company, and others.

Walter F. Angell of Edwards & Angell, representing the United Traction & Electric Company, said that he had not examined the decree and he would like to do so before it was formally entered. Accordingly the matter was deferred.

## Rhode Island Bondholders Organize

The United Traction & Electric Company, a New Jersey corporation owning the major portion of the railway lines operated under lease by the Rhode Island Company, Providence, R. I., for which permanent receivers have been appointed, has appointed a committee of the bondholders for the purpose of protecting the rights and interests attaching to the securities.

The Rhode Island Company has defaulted in payment of its rentals, aggregating \$225,000, and as a consequence payment of interest on the 5 per cent bonds of the United Traction due on March 1 has been indefinitely deferred.

The holders of bonds are urged to deposit their holdings immediately with all interest warrants attached, with either the Rhode Island Hospital Trust Company, Providence, or the First National Bank, Boston, as depositories under a deposit agreement in course of preparation. The depositories will issue temporary certificates which may be exchanged for transferable certificates of deposit.

Philip L. Spalding is chairman of the committee. The other members are Stephen O. Metcalf, Henry D. Sharpe, Malcolm Chace, Eben N. Littlefield, G. C. Lee and W. P. Goodwin.

## Three Receivers for Rhode Island Road

Frank H. Swan, Theodore Francis Green and Zenas W. Bliss were appointed permanent receivers of the Rhode Island Company, Providence, R. I., by Presiding Justice Tanner in the Superior Court of Rhode Island, on March 4.

John J. Orr & Sons, the petitioners for the receivership, were represented by Attorney Edward A. Stockwell. He suggested that Mr. Swan's appointment be made permanent. The attorneys representing the respondents were in favor of the suggestion.

Rathbone Gardner, chairman of the federal trustees of the Rhode Island Company, whose terms expire in July but who have applied to the United States Court of the Southern New York District for an extension of time in which to dispose of the road, nominated Theodore Francis Green, secretary of the trustees, as co-receiver.

Attorney General Rice objected to Mr. Green's appointment, declaring that he was opposed to the selection of any person who had been connected with the conduct of the Rhode Island Company. City Solicitor Elmer S.



## Eight Years of Progress

### Philadelphia Rapid Transit Issues Summary Showing Gains Since Rehabilitation Began in 1911

The Philadelphia (Pa.) Rapid Transit Company has issued in the form of a postcard folder a striking summary of progress from 1911 to 1918, inclusive. In 1910 the company found itself with credit exhausted, earnings insufficient to cover fixed charges, labor threatening and service bad. The Stotesbury-Mitten management then took up the work of rehabilitation, with the results shown in the accompanying tables and the following summary:

**Passengers Carried:** Increased over 70 per cent or more than 320,000,000 passengers. This showing is deemed particularly gratifying in view of the greatly increased use of automobiles.

FARE, WAGE AND DIVIDEND STATISTICS OF PHILADELPHIA RAPID TRANSIT COMPANY DURING 1910-1918

Calendar Year	Passengers Carried	Fare per Passenger (Cents)	Wages of Trainmen (Cents)	P. R. T. Dividend (Per Cent)
1910*	445,599,008	4.13	23	None
1911	520,425,581	4.07	23½	None
1912	553,471,846	4.03	25	None
1913	584,721,865	4.00	30	None
1914	585,364,297	3.95	30	None
1915	598,111,900	3.91	30	None
1916	672,959,447	3.91	32	2
1917	731,470,879	3.91	36	5
1918	767,758,406	3.98	48	5

\* Last year before rehabilitation under Stotesbury-Mitten management.

**Fares:** Lowered from 4.13 cents per passenger through additional free transfer privileges, resulting in a total saving of \$7,941,983 to the car rider. The increase to 3.98 cents per passenger in 1918 was caused by lesser use of free transfers by free-spending war-workers.

**Wages:** Increased to 43 cents per hour, July, 1918; thereafter voluntarily increased to 48 cents per hour by agreement with War Labor Board. Increases for trainmen alone were \$7,692,844 in excess of wage scale effective following 1910 strike.

FINANCIAL STATISTICS OF PHILADELPHIA RAPID TRANSIT COMPANY DURING 1910-1918

Calendar Year	Gross Earnings	Fixed Charges—		Net Income
		Amount	Per Cent Gross	
1910*	\$19,232,622	\$8,717,009	45.32	\$11,222,735
1911	22,147,974	8,842,771	39.93	1560,707
1912	23,282,408	9,032,948	38.80	72,342
1913	24,240,582	9,447,080	38.97	538,496
1914	23,961,408	9,698,125	40.47	201,340
1915	24,315,455	9,792,306	40.27	584,501
1916	27,279,516	9,785,653	35.87	2,377,552
1917	29,726,926	9,745,703	32.79	2,863,684
1918	31,704,427	9,800,039	30.91	1,534,816

\* Last year before rehabilitation under Stotesbury-Mitten management.

† Deficit

**Dividends:** None paid to P. R. T. stockholders until October, 1916. This stock is now on a 5 per cent basis. The total return of \$3,597,578 so far received by P. R. T. stockholders represents less than 1 per cent per annum on their \$30,000,000 from the dates upon which it was actually paid in.

**Gross Earnings:** Have greatly increased over expectations. These large increases were due in part to quickened service and the introduction of new cars, of which 1825 have been secured.

**Fixed Charges:** Required 45.32 per cent of gross earnings in 1910 to meet the rentals and interest account, and this condition left no equity whatever to P. R. T. stockholders. But 30.91 per cent of gross for rentals and interest account (as now) leaves P. R. T. stockholders with a substantial equity in the property.

**Net Income:** The sum of \$4,482,119 was earned in excess of P. R. T. dividends paid. Co-operative efficiency lessened the number of accidents, thus reducing liability costs from 6.08 per cent to 3.47 per cent of gross earnings. This item alone saved \$5,392,054.

## Suspension Followed by Receivership

The Ohio River Electric Railway & Power Company, Pomeroy, Ohio, was placed in the hands of Harry Hartwell as receiver by the United States District Court at Columbus on Feb. 25. The proceeding was brought by the Columbia Avenue Trust Company, Philadelphia, trustee for the bondholders, to enforce payment of interest on the bonds, already defaulted.

The property has been suffering from the rising costs of operation without compensation through much needed increased revenues. Applications have been before the local councils for relief since Nov. 1, but the company has been unable to secure what is absolutely essential. The main difficulty lies in the fact that the company is obliged to deal with two municipalities at the same time. There is keen business rivalry between the places, and no co-operative spirit.

In November, 1917, increases in wages of 7 cents an hour were granted to the motormen and conductors, making the platform rates 30 cents to 35 cents an hour. On Oct. 24, 1918, the motormen and conductors were granted a further increase by a board of arbitration and effective Sept. 1 the following rates became operative: First three months, 38 cents; next nine months, 41 cents; after one year, 43 cents.

In November, 1917, the company was granted increased fares from 5 cents to 7 cents with four tickets for 25 cents, but in November last this rate was repealed by referendum vote and fare reverted to the rates in force when the road was put in operation nineteen years ago.

On Feb. 5 the company notified its men that it could no longer continue to pay the prevailing rates of wages and the men promptly struck. The road has not been in operation since that date. The receivership is the culmination of all these tragic occurrences. In all probability the road will not resume operation until some real settlement of the rate question is made.

## Louisville Dividend Doubtful

### Stockholders at Annual Meeting Are Told That Outlook Shows Lower Net for 1919

Stockholders of the Louisville (Ky.) Railway need expect no dividends in 1919, because the company's operating expenses will be increased and the operating earnings reduced. Such is the tenor of the annual report of President T. J. Minary submitted to the stockholders of the company at the recent annual meeting.

The company's gross operating revenues for the calendar year 1918 totaled \$4,327,211 and its operating expenses, fixed charges and preferred dividends were \$4,072,447. Thus there remained a margin of \$254,764, of which \$249,708 was paid out in common stock dividends, the balance being applied to discount on notes sold. The full statement of income of the company for the year ended Dec. 31, 1918, is shown in the accompanying table.

EARNINGS OF LOUISVILLE RAILWAY FOR CALENDAR YEAR 1918

Transportation revenue (city lines)	\$3,556,031
Transportation revenue (interurban lines)	600,480
Revenue from mail, advertising, trackage and power (city lines)	151,658
Revenue from mail, advertising, trackage and power (interurban lines)	15,284
Other revenue (interest)	3,758

Gross income	\$4,327,211
Operating expenses (city lines)	\$2,383,971
Operating expenses (interurban lines)	499,150
Federal, State, county and city tax for twelve months (city lines)	355,369
Federal, State, county and city tax for twelve months (interurban lines)	31,957
Interest on debt, paid and accrued	627,000
Dividend on preferred stock, 5 per cent	175,000

Total expenses and charges	\$4,072,447
Net income	\$254,764
Dividends on common stock	\$249,708
Discount on notes sold	5,056
	\$254,764

The foregoing figure for operating expenses, it is said, contains a sufficient sum to pay back wages due under the award of the War Labor Board up to Dec. 31, 1918. These increased wages, however, are only from Aug. 16, 1918, so that their full effect upon net income will not be shown until the annual report of the company for 1919.

It is impossible, it is stated, to say what will be the earnings of the company for 1919, or how far they will be affected by the reduction of the number of soldiers occupying Camp Zachary Taylor. It is also impossible to say what will be the operating expenses for 1919. That the operating earnings will be reduced and the operating expenses will increase, due to the award of the War Labor Board, is, however, obvious, in the opinion of the company as expressed to the stockholders.



# Financial News Notes

**Charleston May Issue Common Stock.**—The Charleston Consolidated Railway & Lighting Company, Charleston, S. C., is reported to be considering an increase in its common stock by \$1,500,000, the proceeds to provide for extensive improvements recently made and now being installed.

**Headquarters Removed to New Orleans.**—General headquarters of the American Cities Company are to be transferred from New York City to New Orleans, La., in the near future. The executive committee is now composed of J. K. Newman, chairman; Leo Benoist, Crawford H. Ellis, Frank B. Hayne, Arsene Perrilliat and Lynn H. Dinkins, New Orleans, and Francis T. Homer, New York.

**City Insists Upon Payment.**—The Pittsburgh (Pa.) Railways must make provisions to pay for street repair work, the cost of which is estimated at more than \$900,000, before it pays any more fixed charges, counsel for the city argued in an answer to a petition for payment of \$152,825 in charges, filed with the Federal Court. Failure to meet this obligation might result in forfeiture of franchise, the city intimates.

**New Member of Finance Committee.**—J. J. Spalding, a lawyer of Atlanta, was elected to membership on the finance committee of the board of directors of the Georgia Railway & Power Company, Atlanta, Ga., at the annual meeting on Jan. 28. Mr. Spalding succeeds E. G. Stevenson, Detroit, Mich., who resigned. There was no other change among the personnel of the company's directors, committee members or officers.

**Will Resume Temporarily.**—The Washington Water Power Company, Spokane, Wash., has acceded to the demands of the City Commissioners that none of its electric railway lines be abandoned and the city's threatened suit in the Superior Court to enforce its demand for restoration has been

withdrawn. D. L. Huntington, president of the company, who appeared before the City Council, verbally agreed to resume the asked-for service, but stated that the company made no promises for the future and it might later abandon such of its lines as it should see fit to do.

**Would Charge Off Loss.**—Application was made on Feb. 27 to the State Board of Public Utility Commissioners of New Jersey by the Morris County Traction Company to distribute over a period of years a loss suffered through the sale of its power plants at Dover and Chatham. The company at one time manufactured its power, but for some time past it has been purchasing electric energy. Two years ago it obtained permission to sell the power plants. It now desires to distribute this loss over twenty-nine years, the period during which a mortgage on the property still has to run. The commission has reserved decision.

**Committee Against Akron Increase.**—The railway committee of the Council of Canton, Ohio, has reported against an increase in fare to the Northern Ohio Traction & Light Company, with headquarters at Akron. When the question of municipal ownership was brought up A. C. Blinn, general manager of the company, said that the company was ready to sell. The report stated that since the company had rejected the proposal of the city made on Jan. 31, whereby the company was offered an increase if it made improvements to the lines at an estimated cost of \$45,000, the committee was opposed to granting any increase in fare on the city lines.

**Seattle Sells Bonds.**—The city of Seattle, Wash., on Feb. 25 sold two utility bond issues totalling \$1,150,000, to R. M. Grant Company, Chicago, Ill., and Oscar P. Dix & Company, Seattle, Wash. Both issues had been advertised earlier, but no bids were received. The issues covered \$400,000 of municipal railway bonds and \$750,000 of city light and power bonds, both sold on a 5 per cent basis, to admit of discount. The railway bonds are for the completion of the elevated railway and to pay for new cars recently purchased by the city. The issue also includes \$37,500 to pay for condemnation awards on the elevated. The original \$350,000 bond issue for the municipal elevated has been exhausted.

**Foreclosure Sale March 12.**—The property of the Buffalo, Lockport & Rochester Railway, Rochester, N. Y., will be sold on March 12 in Rochester to the highest bidder. This sale comes from a judgment of foreclosure entered by the Lincoln Trust Company, New York, for itself and other holders of the \$2,799,000 in first mortgage bonds. Indications are that the bondholders will take the road over themselves. The road has been in the hands of the following receivers for several years: Milford W. Childs, Medina; John M. Campbell, formerly of Rochester, and Frank A. Dudley, Niagara Falls. The plan worked out for the reorganization of the company was reviewed in the ELECTRIC RAILWAY JOURNAL for Feb. 22, page 380.

**Will Reduce Authorized Preferred Stock.**—The stockholders of the Tennessee Railway, Light & Power Company, Chattanooga, Tenn., at the annual meeting to be held on April 1, will vote on a proposal to reduce the authorized amount of preferred stock from \$50,000,000 to \$10,250,000, the actual amount now outstanding. This reduction is expected to effect a material saving in taxes, according to an official of the company. Under the laws of Maine, where the company was incorporated, corporations are taxed on the amount of stock authorized. As the company does not contemplate increasing the amount of preferred stock outstanding, it was deemed advisable by officials to bring the figure down to the amount of preferred stock now actually outstanding.

**\$3,000,000 of Notes Approved.**—The Massachusetts Public Service Commission has approved the petition of the Boston Elevated Railway for permission to issue \$3,000,000 face value of notes or negotiable coupon bonds payable in a period not exceeding seven years and bearing interest not exceeding 7 per cent. The funds to be raised in this manner are to provide means for paying for construction and equipment and for funding floating debt and for the payment of the current debts of the company. The commission has also approved the petition of the company for the authority to spend for other capital accounts the unexpended balance received from a sale of bonds amounting to \$132,147, approved by the Public Service Commission in November, 1915.

## Electric Railway Monthly Earnings

### FEDERAL LIGHT & TRACTION COMPANY, NEW YORK, N. Y.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Nov., '18	\$306,291	\$200,645	\$105,646	\$51,707	\$53,939
1m., Nov., '17	268,643	186,536	82,107	50,267	31,840
12m., Nov., '18	3,159,671	2,228,955	930,716	559,836	370,880
12m., Nov., '17	2,559,445	1,798,210	761,235	543,485	217,750

### LAKE SHORE ELECTRIC RAILWAY, CLEVELAND, OHIO

1m., Dec., '18	\$200,636	\$149,977	\$50,659	\$35,832	\$14,827
1m., Dec., '17	167,571	107,350	60,221	39,336	20,885
12m., Dec., '18	2,189,324	1,593,083	596,241	432,861	163,880
12m., Dec., '17	1,786,011	1,210,690	575,321	421,333	153,988

### TWIN CITY RAPID TRANSIT COMPANY, MINNEAPOLIS, MINN.

1m., Jan., '19	\$874,584	\$664,819	\$209,765	\$162,179	\$47,586
1m., Jan., '18	841,724	662,165	179,559	160,515	19,044

\* Includes taxes. † Deficit.

### CLEVELAND, PAINESVILLE & EASTERN RAILROAD, WILLOUGHBY, OHIO

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Dec., '18	\$41,730	\$31,688	\$10,042	\$16,096	†\$6,054
1m., Dec., '17	42,943	29,133	13,810	11,565	2,245
12m., Dec., '18	553,360	371,394	181,966	152,649	29,317
12m., Dec., '17	539,107	339,045	200,062	140,038	60,024

### AURORA, ELGIN & CHICAGO RAILROAD, AURORA, ILL.

1m., Jan., '19	\$186,653	\$168,875	\$17,778	\$38,799	†\$21,021
1m., Jan., '18	129,900	148,608	†18,708	35,651	†54,359

### CITIES SERVICE COMPANY, NEW YORK, N. Y.

1m., Jan., '19	\$1,853,598	\$61,727	\$1,791,871	\$108,003	\$1,683,868
1m., Jan., '18	2,031,462	30,971	2,000,491	205	2,000,286
12m., Jan., '19	22,102,203	552,242	21,549,961	380,377	21,169,584
12m., Jan., '18	19,429,505	366,471	19,063,034	2,770	19,060,264



# Traffic and Transportation

## Jersey Decision Affirmed

Highest Court Sustains Right of Commission to Fix Fares Sufficient Only to Prevent Deficit

The New Jersey Court of Errors and Appeals, by a vote of nine to three, on March 3 handed down a decision affirming the decision of the Supreme Court in the fare increase cases. As a result of the decision the right of the Public Service Railway, Newark, to charge 7 cents and 1 cent for an initial transfer is affirmed. At the same time the Trenton & Mercer County Traction Corporation's right to charge a 6-cent fare and to abolish the sale of the six-for-a-quarter tickets on its lines in the city of Trenton is also affirmed.

### THREE JUDGES DISSENT

The opinion was written by Justice Bergen. Those who concurred in the findings were Chief Justice Gummere, Justices Trenchard, Parker and Minturn, and Judges Heppenheimer, Williams, Taylor and Gardner. Those who dissented were Chancellor Walker, Justice Black and Judge White.

Rebate slips for the return of the excess fare over 5 cents given by the two companies to the public will now be valueless in view of the decision of the highest court in the State. The main contention against the increase was that the Board of Public Utility Commissioners did not take evidence on the valuation of the Public Service Railway property on which to base a rate, and that in the Trenton case the commission accepted the company's own appraisal.

### MAJORITY OPINION QUOTED

In filing an opinion covering the three cases, two of the Public Service Railway and one of the Trenton & Mercer County Traction Corporation, Justice Bergen said:

The Board of Public Utility Commissioners in New Jersey is not required by the statute conferring its powers to in all cases making an appraisal and valuation of the property of a trolley company in order to ascertain what increase in the rates to be charged for transporting passengers is reasonable to provide a sufficient revenue to meet the increased cost of operation due to the enhanced cost of labor, material and governmental imposition of taxes to meet the cost of the war with Germany.

Where the increase made in the rate over what was formerly a reasonable charge, is only sufficient to prevent a deficit in operation, no useful purpose can be served by a valuation of all the property of a public utility company, and it is not a pre-requisite when the statute does not require it.

The concise question presented is: Has the Board of Public Utility Commissioners the power to increase the rate to be charged for transportation service in order to produce a sufficient additional income to meet increased expense in operation growing out of the great advance in the cost of labor and material, principally due to the conditions incident to our war with Germany, and if so was such power lawfully exercised?

Assuming that the rate of 5 cents existing prior to the new conditions was a reasonable one, then the application of ordinary common sense will unhesitatingly lead every fair-minded person to the conclusion that it would not continue to remain reasonable if the cost of production so advances as to destroy the basis upon which it has rested. The solution of such a proposition does not require the aid of legal learning; it is a question of economics which any one of ordinary intelligence can apply.

On a question of whether the commission could properly fix a rate without having evidence before it of the value of the utility company's property, the opinion says:

We are of the opinion that under the facts shown in this case a valuation is not required by law; that the board exercised a reasonable discretion within the legislative powers delegated to it and that no more is exacted from the public than the services rendered are reasonably worth it, if they are to be sufficiently served, or perhaps served at all. The judgments appealed from will be affirmed with costs.

## Six Cents for Warren Upheld

In the case of the borough of Warren versus the Warren (Pa.) Street Railway, the Public Service Commission of Pennsylvania has held that the proposed increase in fares is just and reasonable so long as the present conditions obtain. The commission has therefore dismissed the complaint without prejudice to its renewal any time within one year.

The complaint was against an increase in fares by the railway and presented two questions: (1) the authority of the commission over rates fixed by a franchise ordinance; and (2) that the proposed rates were unjust and unreasonable. In its finding the commission says that its authority to control rates fixed by franchise or ordinance was decided by the case of the Borough of Wilkinsburg versus the Pittsburgh Railways (Complaint Docket No. 1883). The commission holds that where, from all the evidenced adduced, it clearly appears that the net revenue under the proposed rates would be insufficient to provide for the payment of interest on funded debt, obligations for street paving, renewals, depreciation and dividends, there is no need for the commission to find a fair value of all the respondent's property for a rate base.

The Warren Street Railway filed with the Public Service Commission and posted in its office in the Borough of Warren under date of July 27, 1918, to become effective on Sept. 1, 1918, a tariff (1) increasing the 3-cent tickets, which sold in strips of five, to 5 cents per ticket; (2) providing for the sale of books containing thirty-five tickets for \$2, good on city cars only and for the individual purchaser; (3) increasing the single fare on all city cars from 5 cents to 6 cents to any point within the borough.

## West Chester to Zone

Company in Suburban New York Asks Commission to Approve Ten Five-Cent Zones

The Westchester Street Railroad, White Plains, N. Y., on Feb. 27, filed with the Public Service Commission for the Second District, a petition asking to put into effect a new zone system under which it will receive increased revenue. Accompanying the petition by the company were certified resolutions by Scarsdale, White Plains and Mamaroneck and the towns of Greenburgh and Mamaroneck, approving the company's plan. Immediate action will be taken by the commission.

### TEN FIVE-CENT ZONES PLANNED

The new plan provides for ten fare zones, each calling for a 5-cent fare. In urging favorable action by the commission the company says that for the year ended Dec. 31, 1917, its operating deficit was \$36,456 and for the past year \$14,712, and that the corporate deficit on Dec. 31, 1918, was \$91,552 and that the corporate deficit from June 30, 1913, to Dec. 31, 1918, averaged \$50,067 a year.

The company explains the apparent gain in operating deficit in 1918 or 1917 principally by the adjustment of depreciation charges and an abnormally heavy charge for injuries and damages as against a normal charge in 1918. Deficits during the past two years have been due to increase in wages and materials and the company believes these conditions will continue for some time and the estimated deficit for 1919 will be greater than in 1918, the company says, unless relief is secured.

Fare rates were increased in 1918 from 5 cents to 7 cents except from Tarrytown to White Plains, Mount Vernon and the town of Eastchester, but the company says the increases have not been sufficient to meet continuing deficits and consents have been obtained for further increased rates through a new zoning plan.

### CHANGE WANTED FOR LIMITED PERIOD

The commission has been asked to approve the fares specified in the first, second, third, fourth, fifth, eighth, ninth and tenth zones. The company operates in the sixth and seventh zones under a contract with the Westchester Electric Railroad and approval of fares in these zones will be asked through that company. The present application is not for a permanent modification of the rate or a permanent rezoning, but for a limited period as indicated in the consents secured from the different municipalities.

The company operates about 30 miles of electric railway in Mount Vernon, Tarrytown, Mamaroneck, Silver Lake, Rosedale, Elmsford, Tuckahoe, Bronxville, White Plains and Scarsdale. It leases and operates the Shore Line Electric Railroad, White Plains, and in turn is controlled by the New York, New Haven & Hartford. It purchases energy from the New York Central.



## Measure for Measure in Rochester

### Has a Commission with No Authority Over Fares the Right to Require Greater Service Than Traffic Will Support?

The appraised valuation of the New York State Railways, according to evidence given on Feb. 26 before the Public Service Commission for the Second District of New York, is \$53,326,235.

The valuation as given was brought out at a hearing on an order to show cause over service by the New York State Railways in Rochester. The company made the claim that the commission could not order service inasmuch as it has no power to increase fares and that if the commission has the right to order service without increased rates its action is confiscatory of the company's property.

The valuation of the company's property was by G. H. Paine, Chicago. It was made by the company for use in its 6-cent fare application. The total valuation of \$53,326,235 Mr. Paine divided between the Rochester lines, \$26,176,209, and the Syracuse, Utica and Oneida lines, \$27,150,025.

Valuation of the Rochester lines included separate valuations as follows: Rochester city line, one-fare zone, \$17,850,661; Rochester Electric Railroad, leased, \$838,806; Summerville line, \$586,136; Sea Breeze line, \$677,234; Durand & Eastman Park, \$57,875; Rochester & Sodus Bay, \$2,996,253; Rochester & Eastern, \$3,839,596; Ontario Light & Traction Company, \$171,603. These valuations included the valuation of all tangible and intangible property, the cost of financing, value as a going concern and working cash capital required. The total of the tangible and intangible property of the Rochester lines was \$21,731,448.

This valuation was made in 1917 and Mr. Paine explained the observed depreciation totaling \$3,820,547 on the entire New York State Railways of which \$1,641,114 is on the Rochester city lines, including \$1,317,850 on the city fare zone, \$49,249 on the Rochester electric line, \$28,119 on the Summerville line, \$27,601 on the Sea Breeze line, \$1,755 on the Durand and Eastman Park, \$93,567 on the Rochester & Sodus, \$109,567 on the Rochester & Eastern, and \$14,390 Ontario Light & Traction Company. The depreciation figures, Mr. Paine said, were not the result of an actual examination of the companies' properties, but from general observation. The valuation he considered a fair one by averaging the prices of the high and the low years. Mr. Paine was questioned closely as to the manner employed in making his computations, the results in half a dozen large volumes being submitted in the evidence.

Corporation Counsel Cunningham, for the city, wanted to know the scope of the investigation. He wanted time to file an answer. He said he was not prepared to cross-examine Mr. Paine and that if he did go into a cross-examination it would be necessary to

employ an expert and perhaps examine the company's property.

Commissioner Barhite, who presided at the hearing, said the proceeding was in a determination of service in Rochester. The company says it cannot give better service without more revenue and the commission must have the record of the company's financial condition before it can pass on the question if it decides to do so. The railroad and the city, he said, should make the record. The commissioner said he could not tell Mr. Cunningham just what the commission was going to do.

J. M. Joel, auditor of the company, submitted a series of financial statements. They showed that for the year 1918 the operating income of the Rochester lines, without deductions other than taxes, amounted to \$193,569.

After deducting taxes and operating expenses, deficits on lines were given as follows:

Charlotte line, \$31,989; Summerville, \$12,270; Sea Breeze, \$4,478; Rochester and Eastern, \$16,771; Rochester & Sodus Bay, \$61,261; and Glen Haven, \$269. Mr. Joel was examined by Mr. Cunningham with the understanding that certain detail figures are to be furnished the city.

Harris, Beach, Harris & Matson represented the railroad. Supervisor Louis Lubelbeiss of Irondequoit was also called as a witness.

Mr. Beach said the company would have some additional evidence to submit, but the hearing was practically concluded except for the cross-examination by Mr. Cunningham. Mr. Cunningham said he wanted an expert to go over the evidence and the financial statements before he continued his examination.

It was agreed to adjourn until March 19 at Albany.

## State Conference in Washington

### City Authorities, Commission Officials and Railway Representatives Canvass Entire Railway Situation for a Solution

An informal conference was held in Tacoma, Wash., on Feb. 28 between members of the Public Service Commission and various city and electric railway officials of the State. Practically every community in which there is a railway was represented. City officials of Tacoma, Spokane, Bellingham and Seattle were there, and officials of the railway interests in these and other communities presented their case to the commission.

#### FIVE-CENT LIMITATION REMOVED

The conference was called following the passage of a law by the Legislature now in session removing the statutory 5-cent fare limitation. The commission decided upon this after receiving an application from the Washington Water Power Company, Spokane, for permission to charge a 7-cent fare with 1 cent for transfers. The conference was not held for the purpose of considering the Spokane application, but to obtain a general view of the electric railway situation, and to learn the needs of the various communities as well as their desires.

Last July the city of Tacoma, confronted by an intolerable transportation situation, decided to investigate electric railway conditions in that city. In order to assist the officials in an advisory capacity a citizens' committee of twenty-five representatives in its personnel, was appointed to carry on the investigation. That committee has not yet finished its work, but sensing the seriousness of the situation it recommended to the Council last August that relief be granted the Tacoma Railway & Power Company. The Council acted and granted a 7-cent fare as an emergency measure pending the completion of its work by the committee.

The chairman of the citizens' committee, Scott Henderson, reviewed for the conference the results of the work done in considering the Tacoma situation. He frankly confessed that it was a huge task and that he did not know, the city officials did not know and no one knew just what could or would be done even after the long period of study of the problem.

Increased wages granted by the company, he said, and other increased costs had exceeded the increased revenues from the increased fares, leaving the company a little behind where it was before the new fare went into operation. As a matter of fact the company is \$82,000 farther behind after twenty-eight weeks under the 7-cent fare than it was at the end of the six months preceding that period.

The gross earnings increased \$193,728 during the last six months of 1918, which was largely a 7-cent fare period, over the first six months of the same year, but in that same period wages increased \$217,402 and other operating expenses increased \$51,729, a total of \$269,132. In other words the 7-cent fare increased gross earnings 30.5 per cent, but labor costs increased 73.1 per cent.

#### MANY SUGGESTIONS, BUT NO REMEDY

As Tacoma was the actual experimental community in the fare increase the results were made very largely the subject matter of the discussion, and while no one had a real remedy there were many suggestions for relief. As Mr. Henderson put it, the fare increase seemed to be only a shot in the arm administered to revive an expiring patient. He said that some scientific course of treatment would have to follow to restore the sick man of



the public utility world to normal vigor. The suggestions ranged from municipal ownership to 8-cent fares together with transfer charges and relief from franchise burdens. The analysis to which all suggestions were subjected merely showed the impracticability of most of them, but it served to emphasize the need for immediate relief if urban transportation is to remain ade-

quate to the requirements of the community.

Naturally each of the systems represented had its own peculiar problems, but all had a common ailment—insufficient revenues with which to meet the increased wage and other operating expenses. The demonstration of this fact seemed to be the only tangible result of the conference.

## Bay State Trial Fares Approved

### Supreme Court Refuses Argument of Receiver that Commission Fares Will Result in Confiscation

The Massachusetts Supreme Court on Mar. 3 sustained the Public Service Commission in its decision against the institution of a minimum 10-cent fare on the Bay State Street Railway. It will be recalled that in October, 1918, the receiver filed with the commission a schedule establishing enlarged city zones with a uniform cash fare of 10 cents and dividing the country lines into zones about 2 miles long with a minimum cash fare of 10 cents good for two zones, and 5 cents for each additional zone.

The commission refused approval of such rates and substituted for a short trial period a schedule of its own making, as reviewed in the *ELECTRIC RAILWAY JOURNAL* of Dec. 21, 1918. The commission, in brief, proposed a 7-cent ticket fare or a 10-cent cash fare for the combined outer and inner zones in cities, and a 5-cent fare for a 2-mile zone on the country lines, with the option to the company of a 5-cent cash fare or a 7-cent ticket fare for a single zone. These fares were to be tried for two months and with favorable results for another similar period. In the case of no gain in revenue, the commission said it would not further oppose the company's schedule. The receiver, however, appealed to the court on the ground that he was being obliged to charge confiscatory rates.

The Supreme Court now says that whether the rates of fare as presented in the schedule of the receiver be lowered or raised, cogent arguments might be advanced that the revenue likely to be raised thereby would be less than that which would be realized from the schedule of the receiver.

The court, however, also points out that the commission's purpose appears to be to deal fairly with the company, while at the same time having due regard for the interests of the public. Comparative revenue likely to be derived under the two schedules is largely a matter of prophecy. There appears to be good ground for the belief that the commission's plan will be as profitable as that set forth in the receiver's schedule. It cannot be proved that it will produce less additional revenue.

The situation, the court said, seems to bring the present case within the category of cases where the evidence as to the probable result of the rates in controversy would show that they

were so nearly adequate, that is, so nearly equivalent to the amount likely to be realized from the schedules proposed by the receiver, that nothing but a practical test could satisfy the doubt as to their sufficiency.

Furthermore, the period of time for experimentation proposed by the commission (being not over four months in the aggregate and possibly not over two months) in order to determine by actual experience whether its rates yield as much as the estimates of those proposed by the receiver cannot be said to be excessive.

#### Continuing the court says:

Where by all parties in interest the times are recognized as abnormal and the particular period as one of transition so that both the receiver of the railway and the public service commissioners by their words and conduct agree that any substantial return upon the capital honestly and prudently invested must, even under wisely economical management, be suspended temporarily, and that any rates established at the moment are likely to be impermanent and experimental, the public service commissioners are not, under either the constitution of Massachusetts or that of the United States, deprived of power to modify the schedule of rates, fares and charges proposed by the receiver. The public service commission may make such changes therein as in its judgment are required by the public interests and the rights of the owners of invested capital, when the revenue to be derived therefrom is not thereby substantially diminished below that likely to be derived from the rates proposed by the receiver.

The rate-making power established by legislative authority is not stripped of all functions because extraordinary conditions have sprung into existence, which the owners of the privately-owned public utility recognize as preventing them from deriving any income for the time being from their investment; but it still may exercise its judgment for the protection of the public interests when it does not reduce substantially the revenue proposed to be exacted from the public by the owners of the public utility. Simply because such owners are for the moment failing to receive the just compensation to which in the long perspective they are entitled, they are not thereby necessarily at liberty to fix their own terms. Their property is still affected with a public interest.

The result here reached appears to us in harmony with the decisions, to which reference has been made, and is fairly deducible from them. We perceive nothing at variance with it in *Lake Shore & Michigan Southern Railway vs. Smith* (173 U. S. 684) much relied on by the receiver, as modified by *Pennsylvania Railroad vs. Towlers* (245 U. S. 6, 17) or in *Denver vs. Denver Union Water Company* (246 U. S. 178) and *Detroit United Railway vs. Detroit*, (248 U. S. —).

We do not find it necessary to discuss whether circumstances may arise where the public service commissioners may be warranted, even under circumstances such as are here disclosed, in establishing rates likely to yield a revenue less than that likely to be derived from those proposed by the receiver, or less than a fair interest on capital honestly and prudently invested. The present decision is confined to the facts disclosed on this record.

## A Peculiar Case

### Des Moines Railway Commissioner Dismissed for Approving Service Changes

Roy G. Smock, city supervisor of the Des Moines (Iowa) City Railway, was summarily discharged by the City Council on Feb. 26, two days before his resignation was to have taken effect. Mr. Smock's dismissal was by unanimous vote of the Council. It resulted from his having approved the reduction in service proposed by the Des Moines City Railway. Members of the Council felt that Mr. Smock should have withheld action on the cut, leaving it for his successor. His resignation was tendered a month ago.

The new schedule announced by the railway is about a 10 per cent cut in service. It is not as drastic as was forecasted by officials of the company when the application for an increased fare was rejected by Federal Judge Martin J. Wade. The owl car service was not abandoned as at first announced and rush-hour service is not cut. The main reduction is in the non-rush hours with intervals of two or three minutes longer between cars in the morning and afternoon. During the non-rush hours fifty-six cars will be in operation and at the peak load there will be 116.

Mr. Smock in announcing his approval of the service cut issued a statement to the effect that after making a careful study of the earnings of the railway he was satisfied that it could not give the service formerly provided and that he felt he was justified by Judge Wade's rulings in approving the reduction.

Scott Goodrell, who was named as Mr. Smock's successor a month ago, was ordered to report for service immediately after the Council had dismissed Mr. Smock.

The service reduction was scheduled to go into effect on Feb. 27, but a midnight decision on injunction proceedings brought by city attorneys held it up and the case is now on trial before Judge Hubert Utterback of the Polk County District Court. Hearing of evidence on the permanent injunction closed on March 1. Judge Utterback announced that he would render his decision on March 4.

## More Time to File Zone Plan

Granting the request of L. D. H. Gilmour, general solicitor of the Public Service Corporation of New Jersey, Newark, N. J., the Board of Public Utility Commissioners on March 4 extended until March 11, the time for the corporation to file its report on a new zoning system, to be used by the Public Service Railway. Under an order of the board the corporation was directed to file the report on March 1, but Mr. Gilmour informed the commission that the report was in the hands of the printer and that it would be impossible to have it completed before March 11.



## Transportation News Notes

**P.-A.-Y.-E. and Tokens in Springfield.**—The Springfield (Ill.) Consolidated Railway is installing Johnson fare boxes on all of its cars and adopting the pay-as-you-enter method of fare collection together with metal tokens.

**Increase for Jennings Line.**—The Public Service Commission of Missouri has authorized the St. Louis & Jennings Railway, St. Louis, Mo., to increase its fare from 2 to 5 cents for adults and from 1 to 2 cents for children. The commission has ordered the company to sell seven adult tickets for 25 cents, thirty for \$1 and 100 tickets for \$3. The company operates only 2½ miles of line.

**Increased Fare Needed.**—At the annual meeting at Findlay, Ohio, on Feb. 26, B. L. Kilgour, President of the Toledo, Bowling Green & Southern Railway, told the board of directors that increased revenue will be necessary in order that the road may render proper service to the public. The company has asked for an increase in rates at Bowling Green, North Baltimore, Maumee and Portage.

**Elevated Fare Demurrer Sustained.**—Circuit Court Judge Baldwin on Feb. 28 sustained a demurrer filed by the Chicago (Ill.) Elevated Railways to State Attorney Hoyne's amended petition asking for an injunction against the charging of 6-cent fares on the elevated lines. The court said that it is a matter that should be passed upon by the Supreme Court. Mr. Hoyne's assistants said the case would be appealed to the Supreme Court at once.

**Motion for Dismissal in Toledo Case.**—In the case of the appeal of the city of Toledo, Ohio, against the Toledo Railways & Light Company, the company has filed a motion for dismissal in the United States Circuit Court of Appeals at Cincinnati. The appeal is from an injunction granted by the United States District Court, preventing the city from interfering with the rate of fare charged after the expiration of the company's franchises in Toledo.

**Wants Seven Cents in Spokane.**—Seven-cent fare on all railway lines in Spokane—those of the Spokane & Inland Empire Railway as well as the Washington Water Power Company—are provided for in tariffs of both companies, made public on Feb. 21. They call for an increase in fare from 5 cents to 7 cents, with a 1-cent charge for transfers. If no objection is offered to the tariff the Public Service Commission may order the increase without calling a hearing.

**Fare Changes Wanted by Patrons.**—William S. Stearns, attorney for the Town Board of Pomfret, Chataqua County, has filed with the Public Service Commission for the Second District, a complaint accompanying petitions signed by patrons of the Buffalo & Lake Erie Traction Company between Dunkirk and Fredonia, asking the restoration of certain commutation rates, the issuance of transfers and better service in Dunkirk, Fredonia and the town of Pomfret.

**Orders Old Fare Restored.**—The Corporation Commission of Oklahoma has issued an order directing the Pittsburgh County Railway, which operates in McAlester and from McAlester to the Oklahoma State Penitentiary, to restore a 5-cent fare from the city to the State Penitentiary. The railway recently arbitrarily increased the fare from the city to the State Prison to 10 cents and the matter was referred to the Corporation Commission by S. W. Morley, warden of the penitentiary, who asked that the 5-cent fare be restored.

**Agrees to Trial of One-Man Cars.**—Operation of one-man cars was defeated by unanimous vote of the City Council of Norfolk, Va., at its regular meeting recently. Following the vote on the proposition a resolution was adopted instructing the city clerk to notify the United States Housing Corporation of the action taken by the Council and informing the corporation that the Council is prepared to consider any proposition looking to a try out of the cars in Norfolk which will in no way obligate the city or involve the city in any legal complication.

**Complains About Round-Trip Fare.**—The New York State Railways, Utica Lines, in its answer to the complaint against the 27-cent round-trip fare between Clinton and Utica, filed with the Public Service Commission for the Second District, alleges that continuance of a 25-cent round-trip fare would constitute an unlawful discrimination as between the company's patrons in Utica and New Hartford and its Clinton patrons, and that this discrimination was never intended when the railroad's predecessor was granted a franchise. The commission will at once direct a hearing.

**Fare Case in Company's Favor.**—Judge Duval West in the United States District Court in San Antonio, Tex., has handed down a decision holding that the franchise ordinance under which the San Antonio Public Service Company operates its cars does not constitute a binding contract in so far as the 5-cent-fare provision is concerned. Application was made by the company to the City Commission in August to charge a 6-cent fare. The appeal was denied in October. In November the company asked for a hearing. This plea was also rejected by the City Commission.

**Would Make It Easy for Jitneys.**—Senator Henry E. Ackerman of Mon-

mouth County, N. J., has introduced a bill in the New Jersey Legislature providing for the elimination of the bonding feature of the jitney law in municipalities of less than 20,000 people. The Senator says the bill is intended to meet the situation in Long Branch where the local electric railway does not operate in one end of the city and the residents depend entirely upon the jitneys. The bonding companies increased the premium considerably over \$300. The bill does not interfere with the franchise tax or the license fee.

**Handled Big Crowd Easily.**—The two big shows the last part of February—the Auto and the Tractor—materially increased business for the Kansas City (Mo.) Railways. Not only did that company take care of the increased traffic of home people who desired "to come down town and see the show," but it also handled the thousands of visitors satisfactorily. It is estimated that more than 100,000 people came to the city from Missouri and other States to attend the shows. The week's big business showed that the railway is again as able to handle extraordinary demands as ever it was before the recent strike.

**Aiding in Civic Betterment.**—The Chicago, South Bend & Northern Indiana Railway, South Bend, Ind., is aiding the movement for civic growth of the city of South Bend and has contributed generously to publicity space in South Bend newspapers announcing its co-operation in all matters tending to increase the importance of the city in a business, commercial and civic way. The company shows excellent pictures of its freight and passenger stations, urges travel by interurban railway and the use of the interurban railway for freight shipments. The company is also taking a prominent part in the publicity work designed to foster Interurban Trading Day, held every Thursday.

**Open Door Policy in Birmingham.**—Under John Sparrow, recently appointed publicity agent of the Birmingham Railway, Light & Power Company, Birmingham, Ala., all inquiries addressed to the company are promptly answered either by letter or through the newspapers. The company almost daily has published news connected with its actual operation. The rule has been adopted of not announcing a betterment in service until the betterment has become effective. Announcements of the company thus have the weight of authority and the public accepts them in good faith. The records of the receiver of the company are, of course, the records of the court and are therefore open to the public. The public, however, cannot examine these records without unnecessary time and trouble. Mr. Sparrow has full access to the records and to all the operations under the receiver. He presents through the newspapers, in part as news and in part by way of advertisements, all the information in regard to the company in which the public is interested.



## Personal Mention

### J. F. Collins Elected

**Vice-President of Michigan United Railways Made President of Central Electric Railway Association**

J. F. Collins, vice-president and general manager of the Michigan United Railways, Jackson, Mich., was elected president of the Central Electric Railway Association at the annual meeting held in Cleveland, Ohio, on Feb. 27 and 28.

Mr. Collins entered railway work in 1877 as a horse-car driver for the Citizens' Street Railway, Indianapolis, Ind. He advanced step by step with this company to the position of superintendent. In 1898 Mr. Collins went to



J. F. COLLINS

Toledo, Ohio, as superintendent of the Toledo Traction Company and later became manager of railways on the same property. He resigned in 1908 to become general manager of the Saginaw-Bay City Railway, Saginaw, Mich., a property which also furnishes electric lighting and gas service.

In 1910 Mr. Collins resigned from his general managership at Saginaw and returned to Toledo as president of the Toledo & Western Railroad, the Maumee Valley Railways & Light Company, the Toledo, Ottawa Beach & Northern Railway and assistant general manager of the Toledo Railways & Light Company. He resigned these positions in 1912 and went to Jackson, Mich., as vice-president and general manager of the Michigan United Railways and the Michigan Railway, which properties operate more than 400 miles of trolley and third-rail interurban lines in the State of Michigan. Of this mileage more than 200 miles were built under the direction of Mr. Collins since 1912.

Mr. Collins mentions with pride the fact that he has never received one dollar of salary from any other industry than the electric railway.

C. F. Phillips has been appointed freight claim agent of the Toledo & Western Railroad, Toledo, Ohio, to succeed C. C. Cash.

J. C. Ward has been appointed claim agent of the Cleveland, Willoughby & Eastern Railroad, Willoughby, Ohio, to succeed J. H. Shaw.

J. G. Merriman has been elected president of the Asheville & East Tennessee Railroad, Asheville, N. C., to succeed A. S. Guerard.

A. B. Caldwell has been appointed superintendent of the Rochester Electric Division of the Erie Railroad, to succeed J. D. Cummin.

I. C. Martin has been appointed purchasing agent of the Mansfield Public Service & Utility Company, Mansfield, Ohio, to succeed F. E. Ray.

S. C. Stivers, secretary of the Ithaca (N. Y.) Traction Company, has also been appointed treasurer of the company to succeed T. P. Clancy.

Howard Bishing has been appointed roadmaster of the Springfield & Washington Railway, South Charleston, Ohio, to succeed J. H. Lowery.

W. E. Wilson has been appointed electrical engineer of the Cleveland & Eastern Traction Company, Cleveland, Ohio, to succeed F. V. Weldy.

Clarence Wood has been appointed roadmaster of the Cleveland, Painesville & Eastern Railroad, Willoughby, Ohio, to succeed L. J. Rider.

E. R. Wait has been appointed secretary, treasurer and auditor of the Bartlesville (Okla.) Inter-Urban Railway, to succeed L. A. Ramsey.

A. T. Mercier has been appointed superintendent of the Portland, Ore., division of the Southern Pacific Company, to succeed F. L. Burckhalter.

L. Frank Gordon has been appointed claim agent of the Portland, Ore., division of the Southern Pacific Company, to succeed A. S. Rosenbaum.

F. E. Wilkins has been appointed auditor of the Mahoning & Shenango Railway & Light Company, Youngstown, Ohio, to succeed A. E. Dedrick.

Miss P. J. Kelley has been appointed general freight and passenger agent of the Empire State Railroad Corporation, Syracuse, N. Y., to succeed R. E. A. Pitman.

D. M. McLauchlan has been appointed master mechanic of the Portland, Ore., division of the Southern Pacific Company, to succeed C. E. Peck.

William Decker has been appointed master mechanic of the Orange County Traction Company, Newburgh, N. Y., operating 23 miles of line to Newburgh, Orange Lake and Walden, to succeed Edward Schulmyer.

John Harper has been appointed superintendent of transportation of the Cleveland, Painesville & Eastern Railroad, Willoughby, Ohio, to succeed A. C. Flint.

W. H. Goodenough has been appointed master mechanic of the Mansfield Public Service & Utility Company, Mansfield, Ohio, to succeed Riley Perkins.

E. H. Hagensick has resigned as superintendent of electric lines of the Omaha & Council Bluffs Street Railway, Omaha, Neb., to become electrical engineer for the Union Pacific Railroad with headquarters at Omaha. Mr. Hagensick spent seven years in the electrical department of the Union Pacific previous to becoming connected with the electric railway company at Omaha in 1913.

W. O. Jacobi has been superintendent of the electric lines of the Omaha & Council Bluffs Street Railway, Omaha, Neb., taking the place of E. H. Hagensick, who resigned to become electrical engineer for the Union Pacific Railroad. Mr. Jacobi was connected with the Nebraska Power Company in 1905 and 1906, but returned to the Lewis Institute, Chicago, from which he was graduated in 1909. In 1910 and 1911 he was in the employ of the Pullman Company at Pullman, Ill. He entered the electrical department of the railway at Omaha in 1911.

Emil G. Schmidt, president of the Des Moines (Iowa) City Railway and the Interurban Railway, has announced that on his retirement from those organizations he will take active charge as president of the First Trust & Savings Bank, Des Moines. Mr. Schmidt has been president of the bank since its organization three years ago, but has taken no active part in its affairs. Vice-president E. B. Wilson has heretofore been in active charge of the bank. Mr. Schmidt's son, who is now in the service, will also make his home in Des Moines.

Theodore Francis Green, who has been appointed a co-receiver of the Rhode Island Company, is one of the best known and ablest attorneys in Rhode Island. He has been politically prominent for a number of years. He ran for Congress on the Democratic ticket in 1918 and was defeated, while in 1912 his campaign for Governor was also unsuccessful. He has been a federal trustee of the Rhode Island Company for nearly five years, acting as secretary of the body. His other activities were reviewed in the ELECTRIC RAILWAY JOURNAL at the time of his appointment as one of the federal trustees of the railway.

Zenas W. Bliss, former Lieutenant-Governor, who has been appointed a co-receiver of the Rhode Island Company, Providence, R. I., is one of the best known men in Rhode Island. He was born in the town of Johnston on Jan. 10, 1867, and was graduated from the Massachusetts Institute of Technology in 1889. He returned to Providence after his graduation and practiced



for a period as an engineer. Later he entered the real estate business. He was a member of the Cranston, R. I., Town Council from 1901 to 1909. He was a member of the House of Representatives of the Rhode Island Legislature from Cranston from 1903 to 1909. He was chosen speaker of the House in 1909 and the following year was elected Lieutenant-Governor, which office he held for two years. In 1916 Mr. Bliss received the honorary degree of A.M. from Brown University. His last public service was as a member of the State commission to investigate the affairs of the Rhode Island Company.

Col. Thornwell Mullally, assistant to the president of the United Railroads, San Francisco, Cal., who has been away for a year on leave of absence, has announced that he will not return to the position that has been held open for him with the traction company. Colonel Mullally organized and took overseas the regiment of California troops popularly known as "The Grizzlies." He is engaged at present in finding employment for his men who are being mustered out of service. In 1915 Colonel Mullally received a special invitation from General Pershing to join the Pershing column in Mexico for an indefinite period, during which he studied military field tactics and procedure at close range as a "military observer." Colonel Mullally was graduated from Yale University and the New York Law School. He devoted himself to law work in New York until 1906, when he went to San Francisco. In his position as assistant to the president of the United Railroads he rendered invaluable public service in connection with the reconstruction and reorganization of the city's transportation facilities following the fire.

John Sparrow, whose appointment as publicity agent for the Birmingham Railway, Light & Power Company, Birmingham, Ala., was noted briefly in this paper for Feb. 22, was born in Florida. He began life as a "cub" in a printing office and is still sticking to the types as head of the Sparrow Advertising Agency at Birmingham. He was a newspaper man for a number of years, holding every position on the staff from reporter to managing editor. About twenty years ago he went into the advertising and publicity business for himself. About a month before the Birmingham Railway, Light & Power Company was placed in the hands of Lee C. Bradley as receiver, Mr. Sparrow was engaged by Mr. Pevear, general manager of the company, to conduct an informative campaign. At that time the company was the victim of much misrepresentation and a consequent misunderstanding on the part of the public. Through Mr. Sparrow the company began to tell the people in a simple, straightforward way the conditions which the managers were endeavoring to overcome. When Mr. Bradley was appointed receiver he approved the open door policy which had been inaugurated by Mr. Pevear and

determined to continue it on still broader lines. He accordingly appointed Mr. Sparrow to carry on a campaign.

George H. Kelsay, formerly electrical engineer of the Union Traction Company of Indiana, has resigned his position with that company and on March 1 began his new duties as superintendent of power and equipment of the Cleveland, Southwestern & Columbus Railway. His headquarters will be at Elyria, Ohio. Mr. Kelsay was graduated from the engineering school of Purdue University in 1900. After a few weeks spent in the car shops of the Union Traction Company of Indiana he became master mechanic and electrician of the Marion (Ind.) Transit Railway and later was made superintendent. He left this company in 1902 to become master mechanic of the Western Ohio Railway, Lima, meanwhile putting in a few weeks with the Richmond Street & Interurban Railway, Richmond, Ind. During the three years spent with the Western Ohio, Mr.



G. H. KELSAY

Kelsay had supervision of electrical equipment and power lines for this 80-mile interurban railway, which used a transmission voltage of 33,000. From 1905 until Feb. 28, 1919, he was first superintendent of power and later electrical engineer for the Union Traction Company of Indiana. During this time the company grew from a system operating 200 miles of high-speed line and four city properties, with one power plant and fourteen substations, to one with 400 miles of track and five additional power plants. Under his direction the central power plant was enlarged, the transmission system was expanded, three power plants were eliminated and the number of substations was increased to twenty-eight. He has had charge of all electrical equipment in power plants and substations, transmission lines, telephone systems, track building, 75 miles of automatic signal system, electrolysis surveys, and he designed and constructed and later superintended the operation of thirty small lighting plants in the territory served by the railway.

## Obituary

Stephen Sellon, well-known as a British consulting engineer, died recently. For many years he devoted himself to tramway and light railway work, and was one of the foremost in the inception and promotion of new schemes. He figured prominently as a witness when tramway bills were before Parliament, and as a leading member of the Tramways & Light Railways Association he took a large part in negotiations with government departments on matters affecting the welfare of the industry. Along with the British Thomson-Houston Company he was responsible for the introduction of the first electric tramway on the overhead wire system in England. This began operation in Leeds in the end of 1891. He was afterward engineer for the equipment of many trolley lines belonging to the British Electric Traction Company and other companies.

Sir Rodolphe Forget, banker and former Member of Parliament for Charlevoix, died at Montreal, Que., on Feb. 20. He was 57 years old. Sir Rodolphe at an early age entered the office of Senator L. J. Forget as a clerk. In 1887 he became a partner in the firm of L. J. Forget & Company, continuing until 1907, when he severed his connection and began the banking business on his own account, which has since become one of the largest financial concerns in Canada. Sir Rodolphe was an official in the Quebec Railway Light, Heat & Power Company; Quebec & Saguenay Railway Company; the Toronto Railway; Canadian General Electric Company; St. Lawrence Flour Mills Company. He was the organizer of the Montreal Light, Heat & Power Company; the Quebec Railway Light & Power Company, and the Canada Cement Company.

Philip Henry Wynne, at one time with the Boston Elevated Railway, died on Feb. 11 at his summer home in Old Deerfield, Mass., at the age of fifty-one. He was a native of Elizabeth, N. J. His electrical experience, following a course of study at the Massachusetts Institute of Technology, included terms of employment with the Thomson-Houston Electric Company and later in the engineering department of the Boston Elevated Railway during the construction of the rapid transit system. He was a most valued assistant in tests, calculations and work of scientific precision and bore the brunt of much important electrical investigation under John Lundie, then consulting engineer of the company. Mr. Wynne engaged in the design of scientific instruments for about ten years after leaving the Boston company, being associated with the L. E. Knott Apparatus Company. Late in life he gave much time as his health allowed to composing music.



# Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER,

SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES

BUSINESS ANNOUNCEMENTS

## High Prices Unfavorable To Fixed List

**General Electric Doubles List on Wiring Devices to Get Away from Unsatisfactory Condition**

Up to the time that the prices of materials began to skyrocket it was very satisfactory to make a fixed list price, and to change discounts as market conditions warranted. Catalogs on this basis did not have to be changed every time the price changed. It was simply necessary to change the discount sheet.

Lately, however, the margin between list and net has become very small, and not infrequently the net selling price is greater than the list price. A good deal of confusion has been created, and some concerns have gone so far as to abolish the practice of quoting on a list basis and now quote on a net basis altogether.

This week an announcement was made by the General Electric Company relative to a new price schedule affecting its entire line of wiring devices, except inclosed fuses and some similar material, effective March 1, whereby all lists are doubled. The statement reads as follows:

During the active period of the war, when costs advanced very rapidly, the easiest way to accomplish each advance in prices was to reduce discounts. This resulted in a most unsatisfactory method of figuring net prices on many lines, necessitating as it did in many instances selling wiring devices on a list-plus basis. There is no indication that costs will be sufficiently reduced for some time to come to warrant the continuing of this present unsatisfactory method of pricing.

The company decided that the only way immediately to remedy this, without making present catalogs obsolete, was to declare practically all list prices doubled and establish a new schedule of discounts from these doubled lists which gives the same net prices as are now in effect.

## Another Manufacturer Adopts Rental System

**Power Recorders Under Plan Become Property of Lessee's at End of Sixteen Months**

Rental of electric railway equipment is not a new idea to the field although but few manufacturers have utilized this method of distribution of their product. Within the last two or three months, however, two new instances of this means of distribution have been announced, the latest being that of the Arthur Power-Saving Recorder Company, New Haven, Conn.

The rental method of the latest company to adopt this system differs somewhat from the others in that the recorder automatically becomes the property of the renting road after the lease has

run a certain definite length of time. In other words, the manufacturer in this instance finances the purchase of his product for the railway.

According to the terms of the lease the railway taking a lease pays rent for sixteen months, at the end of which time the recorder automatically becomes the property of the road. The manufacturer states that this gives him about 6 per cent on the capital advanced.

Of course should railways so desire, recorders can still be purchased outright.

## Further Price Drops

**Lower Copper Quotations Bring Easier Wire and Bond Prices—Cross Arms Lower**

When quotations for the sale of copper began to decrease below the 26-cent base, there were hopes among buyers of electric railway material that further drops would have an effect of lowering the prices of goods into which copper entered to a large extent. The most noticeable replies to this were in the cases of copper wire and rail bonds. The latter have just dropped off a few per cent, raising the present discount from 20 to 25 per cent.

In different sections of the country there have been slightly different bases reported for the same kind of wire. Bare wire is reported on an 18-cent base at Chicago and Boston, and an 18- to 18½-cent base in New York. Rubber-covered averages close to 23 cents. In Chicago it is quoted on 20- to 23-cent base, in New York on 20- to 25-cent base, in Boston on a 22-cent base and in Atlanta on 23 cents. Weatherproof is given at Chicago as on 18- to 21½-cent base, at New York as 20 cents, Boston quotes 21 cents and Atlanta is on an 18-cent base.

Few other electric-railway materials have been reported off on price. Wood cross-arms recently dropped 5 per cent on carload lots at the mill, with about two weeks delivery. Cedar poles can be delivered from stock while two to three weeks is necessary on chestnut—a considerable improvement. Tape has fluctuated several times in the San Francisco district, the latest report being a 5-per cent increase after a 10-per cent decrease. There seems to be considerable ordering of friction and rubber tape by electric railways in this western territory. Certain kinds of hardware for use on wooden pole construction have decreased 10 to 15 per cent in the San Francisco district. Deliveries on practically all materials have improved since the end of last year.

## Maintenance Material Orders More Frequent

**Smaller Companies Are Sailing Very Close on Their Supplies as Deliveries Become Better**

At the present time with most war orders closed out manufacturers are able to make virtually immediate deliveries on maintenance equipment. One effect of this has been to cause traction companies to cut down the amounts of their orders for various kinds of equipment but to place these orders more frequently, trusting that they will be able, thereby, to benefit by any drop in price which they feel may be imminent.

This small-lot buying, however, has a counter effect in that higher net prices result. It is not reasonable to expect as satisfactory a price on small orders, though given regularly, as on large quantity orders. Much maintenance material is made on automatic machines where it is possible to procure a large production on each setting. In each case, machinery must be set and the cost of this work borne by the goods manufactured. This cost naturally decreases for each unit as the number of units increases.

## LARGER COMPANIES NOT RETRENCHING

Certain large traction systems in the east have not retreated from their former practice of keeping their stocks of maintenance equipment in first-class condition, regardless of the cost of that equipment. The additional cost has been returned in better operation and less time out for repair. Then, after the replacement had been effected and service restored the damaged part has been repaired at leisure where possible.

On smaller traction lines the stocks have been allowed to become so low that necessary repairs or replacements have meant idle equipment until the new part could be procured. This has happened on such replacements as commutator segments on controllers, whereupon there has come a hurry call for a "handful" of new segments.

The idea is similar to the housewife who buys one can of soup each day at maximum unit rate, rather than a case of each of several kinds at a more satisfactory rate by the case, and it is possible that the unit rate per case when prices are higher will be no greater than the unit rate per unit if prices should drop before the cases are all consumed. The chance was taken against a drop in price, and the insurance was the supply ready for any emergency. Buying by case lots tends to strengthen business in any commodity.



No Material Reductions Expected in Lumber Prices

Horace F. Taylor, president of the National Wholesale Lumber Dealers' Association, writing from Buffalo, N. Y., to the Division of Public Works and Construction Developments of the United States Department of Labor, does not hesitate to say material reductions in lumber prices will develop very slowly, if at all. Mr. Taylor says:

The very clear majority of opinion we derive from representatives of the industry in all parts of the country, is in effect that there will be no further reduction in the cost of lumber for a long period, and that there is no safe ground, therefore, for postponing building in the hope of a price reduction in this material. We look upon the present rather quiet conditions as temporary only and due to industrial readjustment, soon to give place to very sound activity. The cost of making lumber offers no chance of reduction, both on account of materials and supplies, and the cost of labor which it seems not only necessary but desirable to maintain at as nearly an adequate rate as possible in view of the present cost of living. In addition to the ordinary increase in demand that is expected, an unusual call for lumber for export to Europe will soon begin to have its effect on the situation. Logging conditions during the present winter have been unfavorable, particularly in the North, and lumber production will apparently be less than that of normal years for some time to come. There is only one possible conclusion based upon the opinion of those consulted and that is that as far as the lumber market is concerned, the present is an advantageous time to purchase.

Inventories of Surplus Government Material

The office of the Director of Sales, War Department, announces additional inventories of surplus materials furnished by the Construction Division of the Army. Among these are rated the following: Miscellaneous electrical equipment, exclusive of machinery, \$200,000; railway equipment, various-weight steel rail, \$1,200,000; ties, \$400,000.

Rolling Stock

Waterville, Fairfield & Oakland Railway, Waterville, Me., has received two new 43-ft. steel passenger cars.

Citizens Railway, Clarksville, Tenn., would like to purchase one or two new cars this year if conditions appear favorable.

Stockton (Cal.) Electric Railway has received three of its order of five new-type safety cars. The other two are due to arrive at any time.

Nashville Railway and Lighting Company, Nashville, Tenn., has placed in service on the West Nashville line four new closed trail cars. These are center-entrance single-truck cars and were constructed entirely in the company's shops.

Trenton & Mercer County Traction Corporation, Trenton, N. J., recently had a car destroyed by fire while standing in the carhouse in Lalor Street. The car was run to the street, where it was burned. The building was not damaged.

Trade Notes

Frank C. Hedley has joined the selling forces of the W. R. Kerschner Company, Inc., 50 Church Street, New York, N. Y.

Holden & White, Inc., have opened a Detroit office at 2213 Dime Bank Building, which will be in charge of Mr. Hinman, and Mr. Quinton will be located in the main office of the company in Chicago.

William H. Fernholz, Mack Building Milwaukee, Wis., has been appointed the exclusive representative in the Wisconsin territory for the Electrical Engineers' Equipment Company, 710 West Madison Street, Chicago.

Badenhausen Company, boiler and engine manufacturer, announces the opening of a Pittsburgh office at 5030 Jenkins Arcade, in charge of A. D. Neeld, Jr. This office will control the sales in the Ohio, West Virginia and western Pennsylvania territory.

E. Besuden, for the past sixteen years sales manager of the Jewett Car Company, has accepted the position of district manager of the railway department, Eastern territory, for the Chicago Varnish Company. Mr. Besuden will occupy offices at 50 Church Street, New York.

Underfeed Stoker Company of America has moved its general offices from Chicago to the Book Building in Detroit. This will not interfere with the sales work of the Chicago district sales offices in the Harris Trust Bldg., nor any of the other district offices.

G. William Crispell has been appointed production superintendent of the Electric Service Supplies Company, in its plant at Philadelphia, Pa. Mr. Crispell received his early training with the General Electric Company. After several years' experience on installation and maintenance work, he became laboratory assistant to the late Prof. James F. McElroy, consulting engineer with the Consolidated Car Heating Company on both electric and steam railway specialties, and for several years was in charge of the electrical manufacturing of this company. Before assuming his present position Mr. Crispell was assistant superintendent of the Westinghouse Electric Products Company, Mansfield, Ohio.

Gear Standardization Meeting.—A well-attended meeting of the standardization committee of the American Gear Manufacturers Association was held at the Hotel Statler, Buffalo, N. Y., on Feb. 10 and 11. Every committee of the association had representatives in attendance, and a well-defined program was laid out for future activities. All phases of the subject of standardization were discussed. According to the action taken in previous sessions, all committees were urged to seek the co-operation of other organizations interested in the standardization of gears.

It is probable that quite an advance toward the standardization of some of the phases will be made at the time of the annual meeting which is to be held in April.

Holland Trolley Supply Company, Cleveland, Ohio, has just opened up a new foundry department and is now ready to take care of its trolley wheel requirements with immediate deliveries of any one of its forty-one different types. In the past the company has been handicapped to some extent in the matter of guaranteeing its mixture, owing to the necessity of having various foundries make up its product, but this trouble is now overcome. No expense has been spared in the equipment purchased, and as the superintendent has had more than forty years' experience in the bronze business, ten years of this being spent manufacturing trolley wheels, the company is looking forward to a large increase in its present volume of business.

C. C. Farmer, until recently assistant Western manager and resident engineer of the Westinghouse Air Brake Company, has been advanced to the position of director of engineering in the same company. Mr. Farmer began his railway career with the Southern Pacific Railway, but in 1891 joined the forces of the Missouri, Kansas & Texas Railway as supervisor of airbrake repairs and later as airbrake inspector of the entire road. After a short service on the Central Railway, he became connected with the Westinghouse Company. John S. Y. Fralich has succeeded Mr. Palmer as resident engineer of the Western district. He has been with the Westinghouse Air Brake Company since June, 1904. Previously he was with the Pennsylvania Railroad.

R. E. S. Geare has been elected president of the Mid-West Manufacturing Company, recently incorporated. Mr. Geare is well known to the construction and power-plant field in Chicago and the Middle West because of his active representation of the T. L. Smith Company, Manistee Iron Works Company, Geare & Company, and others, which work he will still continue. The Mid-West Manufacturing Company has located its factory in Chicago, with general offices in the Old Colony Building. It has acquired the sales and manufacturing rights of the "Continental" chain grate stoker from the Manistee Iron Works, and the "Chaingrip" pipe vise and tools from the Gerolo Manufacturing Company. In addition to this the manufacture of special machines, tools and dies; rebuilding of construction and power plant machinery together with the installation of such machinery will constitute an important part of the new company's activity.

Roller-Smith Company, 233 Broadway, New York City, announces the appointment of Frank R. Ryan to the sales force of its Chicago office at 740 Monadnock Block. Mr. Ryan graduated from the electrical engineering course of Notre Dame University, spent



over a year in the testing department of the Commonwealth Edison Company, about the same time in the testing and operating department of the Sanitary District of Chicago, and was subsequently connected with the Krehbiel Company, consulting engineers of Chicago. For the past six months he has been in the Signal Corps. Mr. Ryan takes the position which was held by Charles H. Nicholson before the latter entered the service and subsequently took charge of the company's Detroit office. The Roller-Smith Company also announces the appointment of the P. I. Perkins Company, 141 Milk Street, Boston, Mass., as its agent in Massachusetts, Connecticut and Rhode Island. The P. I. Perkins Company will handle in this territory the Roller-Smith Company's line of instruments, circuit breakers and meters. W. A. Blachford will give his special attention to the company's Roller-Smith activities.

### New Advertising Literature

**Harry DeSteele, New York:** Folder on assembled commutator segments, field coils, armature coils and general repair work.

**Rome (N. Y.) Wire Company:** Leaflet entitled "Copper History," giving monthly average prices of copper from 1887 to 1918.

**Blaw-Knox Company, Pittsburgh, Pa.:** A folder, "Build Your Roads with Blawforms," and a book, "Blawforms" for Road Construction."

**Green Fuel Economizer Company, Beacon, N. Y.:** Bulletin No. 151, "A Summary of the Facts Regarding Green's Improved Patented Fuel Economizer."

**Lakewood Engineering Company, Cleveland, Ohio:** Bulletin No. 25 entitled "Flat-Wheel Haulage Systems," on industrial storage-battery tractors and trucks.

**Philadelphia (Pa.) Gear Works:** 1919 catalog describing bevel, spiral and generated spur gears, rawhide and micarta pinions, worms and worm gears, racks, lead screws, sprockets and chains.

**Ingersoll-Rand Company, Easton, Pa.:** Bulletin No. 1920 on Leyner oil furnace No. 3; No. 9010 on the Sergeant ticket canceling box; No. 9123 on "Imperial" tie tamping outfits; No. 9026 on Ingersoll-Rand high-speed piston valve steam engine, class "FP"; No. 9028 on Ingersoll-Rand equipment for sugar factory and refinery service.

**Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa.** New 1276-page supply catalog complete under one cover. This supersedes and replaces loose-leaf and sectional catalogs that this company has been publishing for several years past. The new catalog has a very complete index of both style numbers and apparatus manufactured, gives a table of "approximate cost multipliers" and contains considerable information of a technical and engineering nature.

### Track and Roadway

**Pensacola, Fla.**—Surveys have been made and plans submitted to the County Commissioners for the construction of a line from Pensacola to Flomaton, Ala., about 40 miles. Herbert A. Smith, Gonzalez, Fla., is interested.

**Chicago, North Shore & Milwaukee Railroad, Highwood, Ill.**—It is reported that the Chicago, North Shore & Milwaukee Railroad will extend its Libertyville branch to Crystal Lake.

**Evansville & New Harmony Traction Company, Evansville, Ind.**—Plans are being revived for the construction of this company's proposed line from Evansville to Cynthiana and New Harmony. C. J. Seibert, Evansville, general manager. (Jan. 22, '16.)

**Frankfort & Shelbyville Traction Company, Shelbyville, Ky.**—Two new bridges, one 150 ft. and the other 90 ft., will be erected by the Frankfort & Shelbyville Traction Company in connection with its proposed line to connect Frankfort & Shelbyville. F. H. Frankland, Waddell & Son, Inc., New York, N. Y., president. (Feb. 15, '19.)

**New Orleans Railway & Light Company, New Orleans, La.**—About \$60,000 will be spent by the New Orleans Railway & Light Company for new frogs and switches.

**Trenton & Mercer County Traction Corporation, Trenton, N. J.**—Among improvements contemplated by the Trenton & Mercer County Traction Corporation this spring is the construction of an extension of the Market Street division to the new municipal dock along the Delaware River. About 12,000 new ties will also be placed in connection with general repairs to the roadbed on the various divisions.

**New York State Railways, Utica, N. Y.**—The Public Service Commission for the Second District of New York recently passed an order granting the New York State Railways an extension of time until July 1 to make track improvements in Whitesboro.

**Carolina Power & Light Company, Raleigh, N. C.**—The construction of an extension from Goldsboro to Mount Olive is being contemplated by the Carolina Power & Light Company.

**Toronto & York Radial Railway, Toronto, Ont.**—By the terms of an agreement arrived at between representatives of the city of Toronto and the Toronto & York Radial Railway, the city has arranged to purchase from the company for \$590,000 the Yonge Street section of the Metropolitan division, lying between its southern terminus near Farnham Avenue and the city limits, together with certain rolling stock and the company's rights and franchise in connection with this section. The program of the city includes the establishment of a terminal at the Union station for the transshipment of freight and the paving and double-tracking of the section acquired immediately the agreement is ratified.

**Dallas (Tex.) Railway.**—Work has just been completed by the Dallas Railway on the reconstruction of its tracks on Jefferson Street between Wood and Commerce Streets. The company will begin early this month on the reconstruction of its tracks on Main Street from Ervay to Poydrus Streets. Heavier rails will be laid on a concrete foundation. On the completion of this work the company will reconstruct the tracks on Jefferson Avenue from Lancaster to Polk Streets. The work will cost about \$350,000.

**Eastland, Wichita Falls & Gulf Railroad, Eastland, Tex.**—Bids are being asked by the Eastland, Wichita Falls & Gulf Railroad for the construction of a line from Eastland to Mangum, 7 miles. O. B. Colquitt, president, and C. H. Chamberlin, chief engineer.

**Newport News & Hampton Railway, Gas & Electric Company, Newport News, Va.**—Plans are being made by the Newport News & Hampton Railway, Gas & Electric Company for extensive new construction work this spring.

### Power Houses, Shops and Buildings

**Birmingham Railway, Light & Power Company, Birmingham, Ala.**—Work will be begun within the next few months by the Birmingham Railway, Light & Power Company on the installation of new equipment and improvements to its gas plant at Third Avenue and Thirteenth Street at a cost of about \$75,000. A new water gas set will be installed.

**Southwestern Gas & Electric Company, Texarkana, Ark.**—This company will reconstruct its carhouse and shops recently damaged by fire to the extent of about \$75,000.

**San Diego & Arizona Railway, San Diego, Cal.**—A contract has recently been awarded by the San Diego & Arizona Railway for the erection of a boiler plant at Sixteenth and Main Streets in connection with other improvements, the entire work being estimated to cost \$19,527.

**Washington Railway & Electric Company, Washington, D. C.**—Fire recently destroyed a part of the Eckington carhouse of the Washington Railway & Electric Company at Fourth and T Streets, northeast, together with twelve cars. The loss is estimated at approximately \$150,000.

**Pittsburgh (Pa.) Railways.**—A new station will be built by the Pittsburgh Railways at Castle Shannon. An addition will also be built by the company to its power house at McKees Rocks.

**Montreal (Que.) Tramways.**—Plans have been prepared by the Montreal Tramways for the erection of a substation on Cute Street, to cost \$400,000, and also for a new carhouse at Fullum and Mount Royal Streets, to cost \$110,000.



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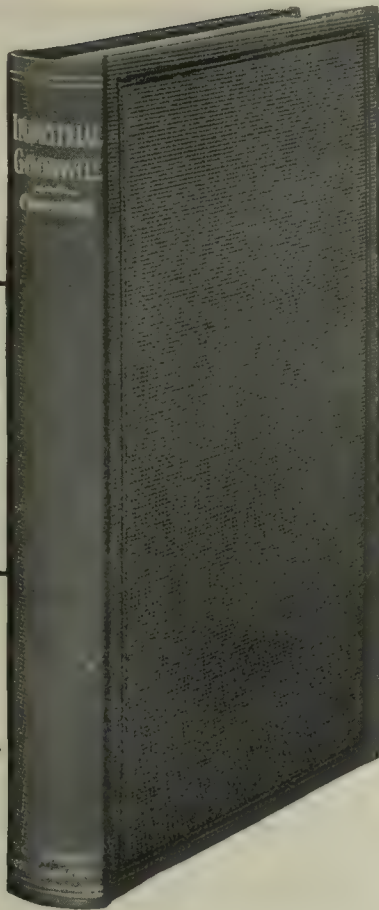
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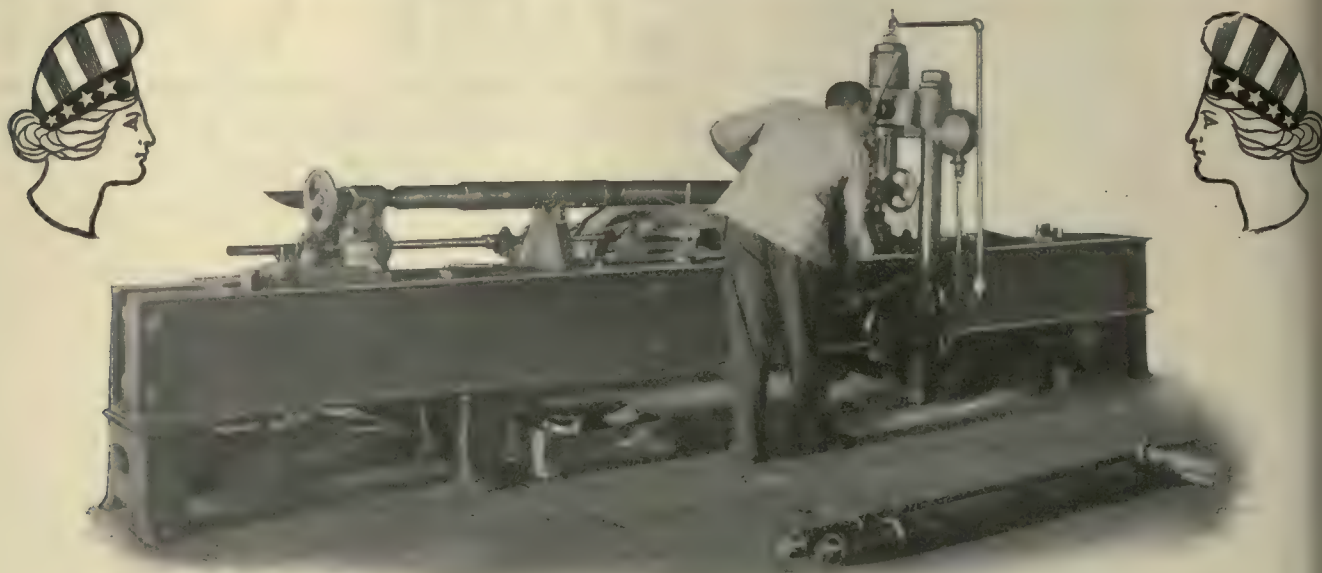
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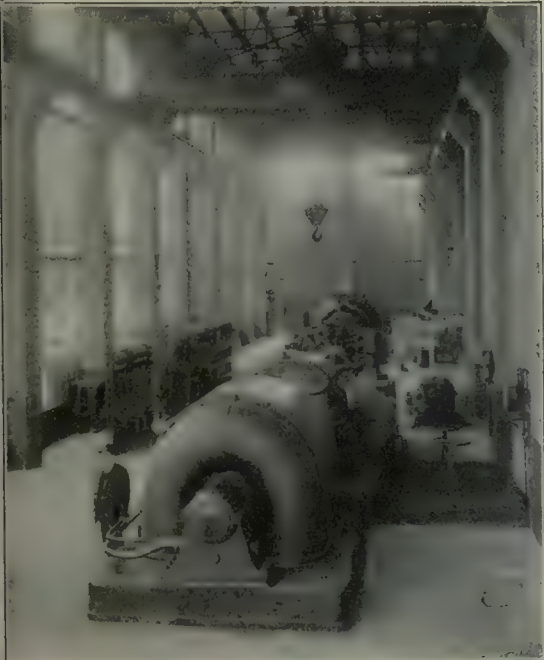


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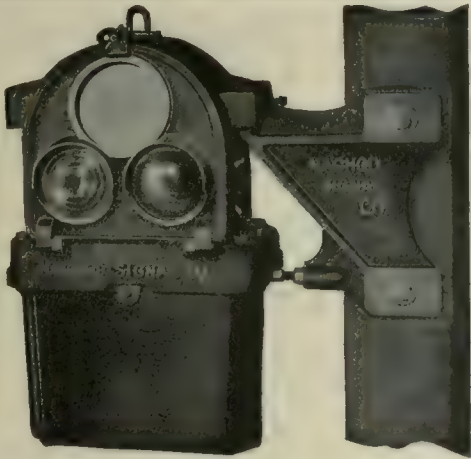
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Steel and Copper Wire

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TRENTON, NEW JERSEY

## "NATIONAL" TUBULAR STEEL POLES

are dependable, durable and efficient in service.  
For electric lines and power transmission, they  
are

The Recognized Standard of Quality

**NATIONAL TUBE COMPANY, PITTSBURGH, PA.**



## LINCOLN WELDING EQUIPMENT

insures maximum efficiency  
at minimum cost.

*Lincoln Dynamotors  
Lincoln Rail Bonds  
Gailor Welded Joints*

**THE LINCOLN BONDING CO.**  
636 Huron Road, Cleveland, U. S. A.

## The SCOOP CONVEYOR does the work of 6 to 12 men

Over 1000 users find that it keeps equipment moving and cuts handling costs. Fifty per cent of them send "repeat orders." Used for loading and unloading for storing and reclaiming coal, coke and similar materials and for handling boxes, bags and bulky packages.

Send for illustrated literature.

**PORTABLE MACHINERY CO., Inc.,**  
Passaic, N. J.



## SPECIAL TRACK WORK

SWITCHES, FROGS AND CROSSINGS.  
ANTI-KICKING BIG HEEL  
SWITCHES.



TRACK WORK  
OF EVERY DESCRIPTION.  
HARD CENTER CONSTRUCTION.

Balkwill Articulated Cast Manganese Crossings

**New York Switch & Crossing Co.**  
Hoboken, N. J.

## Dependable Track Work for Electric Railways



Frogs, Switches, Switch Stands, Crossings, Special Track Work, Machine and Drop Forgings, Pressed Steel and Hammer Work. Foundry for Manganese Steel Castings and special facilities for heat treating. Let us bid on your requirements.

**ST. LOUIS FROG & SWITCH CO.**  
ST. LOUIS, MO.

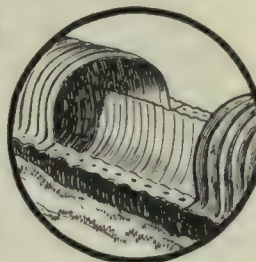
## ACME (NESTABLE) CORRUGATED CULVERTS

The sectional character of "ACMES" offers other advantages beside easy transportation.

Any length may be installed without joining bands.

It can be put together under trestles or in failing wooden culverts where full circle culverts would be impractical.

When used for conduit or similar purposes or if it becomes clogged for any reason, it is an easy matter to

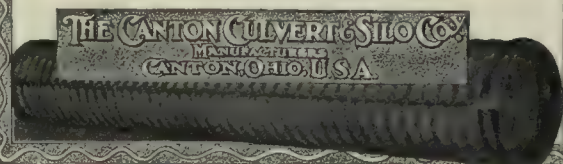


## Remove any Top Section

The flanges formed by joining the sections help the corrugations to hold the culvert in place during floods. The NO-CO-RO METAL (99.90% pure iron) guarantees lasting qualities.

We will ship them in diameters 8 to 72 inches. Set-up or knocked down and nested, as you prefer.

Write for Catalog M-21



## BARBOUR-STOCKWELL CO.

205 Broadway, Cambridgeport, Mass.  
Established 1858

Manufacturers of

Special Work for Street Railways

Frogs, Crossings, Switches and Mates

Turnouts and Cross Connections

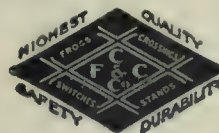
Kerwin Portable Crossovers

Balkwill Articulated Cast Manganese Crossings

ESTIMATES PROMPTLY FURNISHED

## HIGHEST QUALITY

TRACK SPECIAL WORK

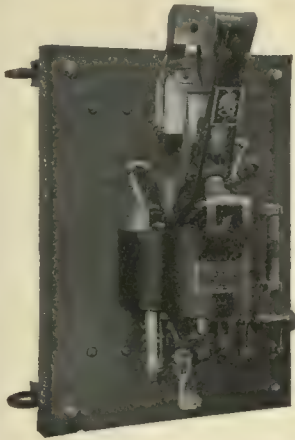


**WE MAKE THIS GRADE ONLY**

**CLEVELAND FROG & CROSSING CO.**  
CLEVELAND, OHIO



How many \$ do you spend for repairs due to burn-outs and how many \$ do you lose due to delays in a year?



Operating costs have been reduced and delays eliminated in thousands of instances by the use of

### AUTOMATIC RECLOSING CIRCUIT BREAKERS

You may ignore the assistance we offer, but you cannot evade paying the bills and contending with delays as you have in the past.

Why Not Reduce Your Costs and at the Same Time Get Better Service!

IT'S UP TO YOU!

Send for Bulletin No. 30 Right Now.

The Automatic Reclosing Circuit  
Breaker Co.

Columbus, Ohio

U. S. A.

## MILBURN

### Night Sunshine



Night work is a railway necessity. It is the best time for repairs and new construction. Schedules are low, traffic scarce. But you need light, and plenty of it. Light in the dark corners—light that shows up every detail and minimizes costly errors. You need the *night sunshine* supplied by Milburn Portable Acetylene Lights.

Little Operating Cost.  
Big Operating Value.  
Send for Circular 233.

The Alexander Milburn Co.  
Baltimore, U. S. A.

## The Babcock & Wilcox Company

85 Liberty Street, New York

### WATER TUBE STEAM BOILERS

Steam Superheaters

Mechanical Stokers

Works: BARBERTON, OHIO—BAYONNE, N. J.

#### BRANCH OFFICES:

ATLANTA, Candler Building  
BOSTON, 49 Federal St.  
CHICAGO, Marquette Building  
CINCINNATI, Traction Building  
CLEVELAND, Guardian Building  
DENVER, 435 Seventeenth St.

HAVANA, CUBA, Calle de Aguilar 104  
HOUSTON, TEXAS, Southern Pacific Bldg.  
LOS ANGELES, I. N. Van Nuys Bldg.  
NEW ORLEANS, 533 Baronne St.  
PHILADELPHIA, North American Bldg.  
PITTSBURGH, Farmers' Deposit Bank Bldg.

SALT LAKE CITY, 705-6 Kearns Bldg.  
SAN FRANCISCO, Sheldon Bldg.  
SAN JUAN, Porto Rico, Royal Bank Bldg.  
SEATTLE, Mutual Life Bldg.  
TUCSON, ARIZONA, Santa Rita Hotel Bldg.

## FOSTER SUPERHEATERS

Greatly Increase  
Efficiency and Power of  
Steam Turbines.  
POWER SPECIALTY CO.  
Trinity Building, 111 Broadway  
NEW YORK

## RAMAPO

Automatic Safety and Automatic Return Switch Stands for Passing Sidings. Tee Rail Special Work for Interurban Lines and Private Rights of Way. Manganese Construction a Specialty.

Ramapo Iron Works

HILLBURN, NEW YORK

Plants at Hillburn, N.Y. and Niagara Falls, N.Y. New York Office, 30 Church Street

### THE WEISS SWITCH LOCK PREVENTS SPLIT SWITCHES

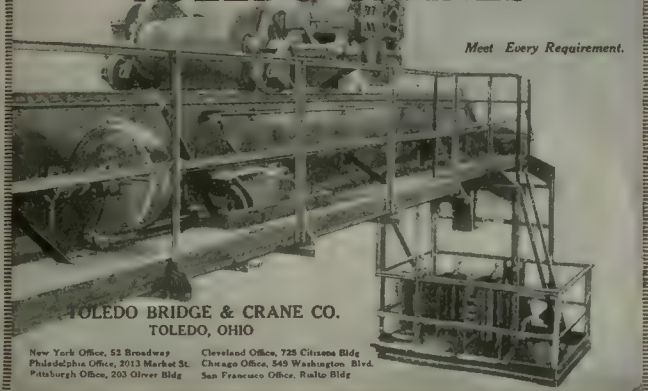
A positive locking switch lock that locks right and left. Water-proof, non-freezable, mud-proof and sand-proof. Simple in construction, perfect in operation and easily installed. Positively prevents split switches.

Write for complete information and quotations.

WEISS SWITCH LOCK CO., 600 Capitol Ave., Springfield, Ill.



*Meet Every Requirement.*



New York Office, 52 Broadway  
Philadelphia Office, 2013 Market St.  
Pittsburgh Office, 203 Oliver Bldg  
Cleveland Office, 728 Citizens Bldg  
Chicago Office, 549 Washington Blvd  
San Francisco Office, Rialto Bldg

111 BROADWAY, NEW YORK

**For Electric Railway Repair Shops**

**Axle Lathes  
Wheel Presses  
Shapers, Drills  
Slotters, Planers  
Steam Hammers  
Electric Traveling  
Cranes**



**Send  
for  
Catalogs**

## "BLVD" TRANSMISSION TOWERS

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Судебная коллегия по уголовным делам Верховного Суда Российской Федерации

# THE TERRY TURBINE

# WATER

**PURIFICATION SYSTEMS  
SOFTENING & FILTRATION  
FOR BOILER FEED AND  
ALL INDUSTRIAL USES**

**WM.B.SCAIFE & SONS CO.PITTSBURGH,PA.**



for heavy street railway work are the best obtainable. Write for New Complete Catalogue.

**143 Richards Street, Brooklyn, N. Y.**  
**143 So. Clinton Street, Chicago, Ill.**

was the distance covered before this set of brushes was inspected. Even then they were in excellent condition and good for several thousand additional miles. Other brushes delivered 18,000 or less.

are especially designed for the service in which they are to operate.

Saginaw, Michigan, U. S. A.

Branch Offices: New York, Pittsburgh, Philadelphia, Atlanta,  
Chicago, St. Louis, Denver, San Francisco.

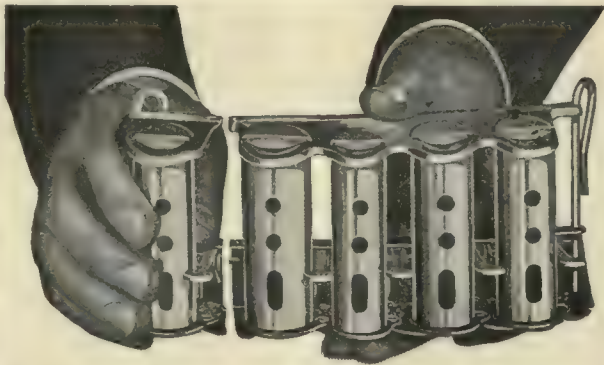
We guarantee immediate deliveries; reasonable prices; first class workmanship to stand any test. No tapping necessary on threads of bolts after galvanizing. Galvanized angles furnished cut and bent to length and punched.

**JOSEPH P. CATTIE & BROS.**  
Gaul and Adams Sts., Philadelphia, Pa.

# GREEN CHAIN GRATES

GREEN ENGINEERING CO. East Chicago, Ind.





### A Great Improvement in Coin Changers

The McGill HIGH-SPEED Lever-operated Changer is now built with a gear movement instead of a curved cam. If desired a fifth barrel can be attached, which will meet all practical requirements of fare collections. The new machine can be supplied to eject quarters, dimes, nickels, single pennies,

or 4 or 5 pennies at one time. Also 4 nickels at a time; also metal checks for fare box service.

Write for description.

**McGill Ticket  
Punch Co.**

542 W. Harrison St.  
CHICAGO



### Full power with High or Lower Adjustment

Many emergencies requiring a powerful jack present a difficulty in bringing the jack to bear on the load. The

### Buckeye Emergency Jack No. 239 Special

saves time, strength and trouble. The many positions to which it is adjustable easily solve perplexing lifting problems. Full details in our catalog. Write for it.

**The Buckeye  
Jack Mfg. Co.**

Alliance, Ohio



### The Zone System of Fares

is successfully collected  
with the aid of  
**CLEVELAND  
FARE BOXES**

Ask Us for Particulars

**The Cleveland Fare  
Box Co.**

Cleveland, Ohio  
Canadian Branch, Preston, Ont.



### Let Us Assist You to Cut Maintenance Costs.

The Sup't of Equip't of large road stated—"I don't know what we would have done, with the scarcity of shop hands, without your fingers; but we are now able to keep the controllers in better shape, and effect a saving of 55% in wages, which more than pays total cost of the fingers."

### Triggerlock Reversible Controller Finger.

814-16 Bath Ave. 557 King St., West  
Niagara Falls, N. Y. Toronto, Canada



T. L. K-6

### The Big Three D & W Fuses, Deltabeston Wire D & W Oil Fuse Cutouts D & W Fuse Co., Providence, R. I.



**INSULATING TAPE**  
of  
Quality

**STANDARD**  
Woven Fabric Co  
Walpole, Mass.

### Buy—Exchange—Sell

Some other reader may have just what you want—and he may be in the market for the items you wish to turn into cash.

Let the Searchlight help YOU

54

### FORD TRIBLOC

A Chain Hoist that excels in every feature. It has Planetary Gears, Steel Parts,  $3\frac{1}{2}$  to 1 factor of Safety. It's the only Block that carries a five-year guarantee.

FORD CHAIN BLOCK & MFG. CO.  
Second and Diamond Sta., Philadelphia



### "Everything In Insulation"

Mica  
Vulcanized Fibre  
Varnished Cloth  
Insulating Tapes

Waxes  
Asphalts  
Compounds  
Insulating Varnish

The above are only a few of our products  
Write us for anything in this line you may require.  
**MITCHELL-RAND M'FG CO.**  
103 John St., New York City

**Simplex Jacks**  
for  
Railroads-Contractors-Industries  
Automobiles-Pole Pulling and Ordnance  
**Templeton, Kenly & Co., Ltd.**  
London Chicago Paris



# International Specialties Cover the Entire Range of Fare Collection

Money-counting fare boxes; Coin and metal ticket-counting fare boxes; Coin registers; Coin and transfer registers; Coin, metal ticket and transfer registers; Motor-driven coin and transfer registers; Motor-driven registers for station, ferry, park and terminal use; Metal and paper registers with single hopper; Round and square registers; Transfer printers; Heeren Enameled Badges; Punches and Bell Cord.

**The International Register Company**  
15 South Throop Street, Chicago



## HALE & KILBURN

*No. 108-AV Stationary Seat  
For One-Man Safety Cars.*

The unmatched H&K Seat beats the world for strength and lightness. Every Safety Car should be equipped with it.

**Hale & Kilburn Corporation**

New York	Philadelphia	St. Louis
Detroit	Chicago	Atlanta
Louisville	Washington	Dallas
	San Francisco	

75% of the electric railways

use

**B-V Punches**

Send for Catalog.

BONNEY-VEHSLAGE TOOL CO., Newark, N.J.



Use them in your terminals—  
**PERY TURNSTILES  
or PASSIMETERS**

*Faster than the ticket seller*

**Pery Manufacturing Co., Inc.**  
30 Church Street, New York City

## Heating and Ventilating

Let us demonstrate to you how we can heat and ventilate your cars at the lowest possible cost

**The Cooper Heater Company**  
Carlisle, Pa.

## Bonham Traffic Recorders

Show origin and destination of every fare collected as well as other valuable traffic data.

**The Bonham Recorder Co., Hamilton, O.**

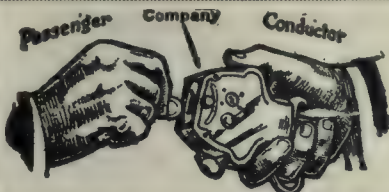
# “It Behooves You to Hooverize Your Motormen”

*We can help you*

Write to

**The Arthur Power-Saving Recorder Co.**  
2nd National Bank Bldg., New Haven, Conn.

When writing to Advertisers in this publication you will confer a favor on both publisher and advertiser by mentioning the Electric Railway Journal



**Direct  
Automatic  
Registration  
By the  
Passenger**

**Rooke Automatic  
Register Co.**  
Providence, R. I.



## Outwore Four Trolley Wheels



After traveling 27,633 miles in actual service, this Oil-less Bushing shows practically no signs of wear.

## BOUND-BROOK

GRAPHITE AND BRONZE

## Oil-less Bushings

Though Bound Brook (Oil-less) Trolley Wheel Bushings require little or no attention *they never run out of lubricant.* They are the only bushings whose lubrication cannot be disturbed by centrifugal force. No other type affords such protection against premature wear and trouble.

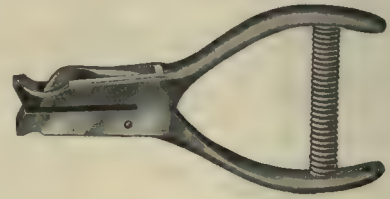
*All Genuine Graphited Oil-Less Bushings have always been made at Bound Brook, U. S. A.*

### BOUND BROOK OIL-LESS BEARING CO.

*"Specialists in the manufacture of Oil-less Bushings for more than a third of a century."*

Bound Brook, New Jersey

## X TICKET PUNCHES



EXELL MANUFACTURING CO.

NEW HAVEN, CONN.

## WE CAN CUT YOUR COST OF HEATING CURRENT

Write for THERMOSTATIC CONTROL INFORMATION

# GOLD

**ELECTRIC HEATERS** Cut Installation and Maintenance Charge.

**VENTILATORS** Also Ventilate in Stormy Weather. **THERMOSTATS** Save Current.

**ORIGINATED** the use of **NON-CORROSIVE** Wire for Electric Car Heaters.

**ORIGINATED** The Ventilated Coil Support.

LET US FIGURE ON YOUR NEXT REQUIREMENTS  
**Gold Car Heating & Lighting Co., 17 Battery Pl., New York**

## Holden & White Inc.

### Electric Railway Sales Distributors for:

Anderson Brake Slack Adjusters.  
Garland Ventilators. Miller Trolley Shoe.  
Perry-Hartman Center Plates and Side Bearings.  
Watson Car Lighting Regulator.  
Wasson Air-Retrieving Trolley Bases (U. S.).  
Reliance Air Sanders. Air Rectifier.

### Chicago District Representatives for:

Drew Line Material  
Columbia Car & Shop Equipment  
Lincoln Rail Bonding and Bonds  
Atlantic Equipments for Joint Welding

817 Fisher Building

CHICAGO

Electric car heaters—thermostatic control—pneumatic car door operators—buzzers, single-stroke bells, starting signal lights—special resistances.

**CONSOLIDATED CAR HEATING CO.**  
ALBANY, NEW YORK, CHICAGO

## FUEL CONSERVATION

is a necessity and the heating and ventilating of street cars should be accomplished the most economical way. Our Hot Air Forced Ventilation Equipment combines heat with ventilation at a saving of 50% to 70% over electric heat.

**THE PETER SMITH HEATER CO. DETROIT, MICH.**

## "Boyerized" Products Reduce Maintenance

Bemis Trucks	Manganese Brake Heads
Case Hardened Brake Pins	Manganese Transom Plates
Case Hardened Bushings	Manganese Body Bushings
Case Hardened Nuts and Bolts	Bronze Axle Bearings

Bemis Pins are absolutely smooth and true in diameter. We carry 40 different sizes of case hardened pins in stock. Samples furnished. Write for full data.

**Bemis Car Truck Co., Springfield, Mass.**



**MASON SAFETY TREAD**—Lead or carborundum filled; non-slippery; prevents accidents; cuts out damage suits.

**KARBOLITH CAR FLOORING**—For steel cars; is sanitary, light weight fire proof, non-slippery.

**STANWOOD STEPS**—Self-cleaning, non-slippery, light. Over six million feet used without accident being reported within the knowledge of manufacturer.

Our products used on all leading railroads on cars and stations. For details address:

**AMERICAN MASON SAFETY TREAD CO., Lowell, Mass.**  
Branch Offices: Boston, New York City, Philadelphia.  
Agencies in all principal cities.



# MORE-JONES

Armature Babbitt Metal is unusually long wearing and eliminates the tremendous expense of frequent reab-bitting.

Designed particularly for electric railway armature bearing service, and recognized the world over for un-excelled quality.

# BABBITT METAL

More-Jones Brass & Metal Co.  
St. Louis, Mo., U. S. A.

## The Kalamazoo Trolley Wheels

have always been made of entirely new metal, which accounts for their long life WITHOUT INJURY TO THE WIRE. Do not be misled by statements of large mileage, because a wheel that will run too long will damage the wire. If our catalogue does not show the style you need, write us—the LARGEST EXCLUSIVE TROLLEY WHEEL MAKERS IN THE WORLD.



THE STAR BRASS WORKS  
KALAMAZOO, MICH., U. S. A.

## PYRAMID BRUSHES

For Electric Railway Service

The high speeds, short stops and quick get-aways of electric railway cars and trains demand the use of brushes of the highest efficiency. The quality of Pyramid Brushes has made them the recognized standard of the electric railway field.



Trade Mark

National Carbon Company, Inc.  
Cleveland, Ohio

## PROVIDENCE

FENDERS

## H-B

LIFE GUARDS

The Consolidated Car Fender Co., Providence, R. I.  
Manufacturers of The Providence Fender and H-B Life Guard  
Wendell & MacDuffie Co., 61 Broadway, New York  
General Sales Agents

## The "Nycap-Exide" Battery

for

STORAGE BATTERY STREET CARS

THE ELECTRIC STORAGE BATTERY CO  
PHILADELPHIA

## "LE CARBONE" CARBON BRUSHES

Le Carbone  
Carbon Brushes are  
uniform. They talk  
for themselves.

W. J. Jeandron  
173 Fulton Street  
New York City

Pittsburgh Office:  
636 Wabash Building

Canadian Distributors:  
Lyman Tube & Supply Co., Ltd.  
Montreal and Toronto

## Steel for Service

This company makes

## Rolled Steel Wheels

which range in size from those for light industrial cars to the largest electric railway type.

They are the result of long years of experience on the part of men who excel in the art of rolling steel.

## Carnegie Steel Company

Frick Building Annex, Pittsburgh, Pa.

1146

The Most Successful Men in the Electric Railway Industry read the

## ELECTRIC RAILWAY JOURNAL

Every Week

## RAILWAY UTILITY COMPANY

Sole Manufacturers

"HONEYCOMB" AND "ROUND JET" VENTILATORS  
for Monitor and Arch Roof Cars and all classes of buildings;  
also ELECTRIC THERMOMETER CONTROL  
of Car Temperatures.

141-151 WEST 22D ST.  
Chicago, Ill.

Write for  
Catalogue

1328 BROADWAY  
New York, N. Y.





# SEARCHLIGHT



# SECTION



## Get Your Wants into the Searchlight

### ADVERTISING RATES

#### Ads Set in Uniform Style

(Solid, in one paragraph, without display.)

**THREE CENTS A WORD**, minimum charge 50 cents an insertion, payable in advance, less 10 per cent if one payment is made in advance for four continuous insertions—for advertisements under:

Positions Wanted	Vacation Work Wanted
Evening Work Wanted	Tutoring
	Salesman Wants Connections

**FIVE CENTS A WORD**, minimum charge \$1.50 an insertion, for advertisement under:

Agencies Wanted	Positions Vacant
Agents Wanted	Partner Wanted
Business Opportunities	Representations Wanted
Desk Room for Rent	Salesmen Wanted
Educational	Patents for Sale
Employment Agencies	Plants for Sale
Desk Room Wanted	Sub-Contracts Wanted
Foreign Business	Work Wanted
Miscellaneous for Sale, for Rent or Want Ads.	

**THIRTY CENTS A LINE**, minimum five lines, for all undisplayed advertisements set with a paragraph for each item or tabulated.

**THREE DOLLARS AND SIXTY CENTS AN INCH** for advertisements for bids (Official Proposals).

#### Ads Set in Display Type

(Individual space, within border rules.)

Space for these advertisements is sold by the inch. Each page contains 30 inches. The rate per inch is based on the total number of inches to be used—that is, the number of inches the advertisement is to occupy multiplied by the number of insertions it is to receive. For instance, a 2-inch advertisement in 2 issues earns the 4-inch rate of \$2.90 an inch. A 1-inch space for 4 issues, or a 4-inch space in one issue, also earn the 4-inch rate.

#### SCHEDULE OF RATES

1 to 3 in., \$3.00 an in.	15 to 26 in., \$2.70 an in.
4 to 7 in., 2.90 an in.	27 to 49 in., 2.60 an in.
8 to 14 in., 2.80 an in.	50 to 99 in., 2.50 an in.

Rates for larger space furnished on request.

*For quick and satisfactory results  
tell the reader everything that  
he will want to know.*

### INFORMATION

**ALLOW FIVE WORDS** for the address, if replies are to a box number in care of any of our offices. There is no extra charge for forwarding replies.

**IN REPLYING TO ADS**, do not enclose original testimonials or anything that you may want returned. State your experience and qualifications in as concise and neat a manner as possible and enclose copies of your testimonials.

**BE CAREFUL TO PUT ON ENVELOPE**, when answering any "blind" ad, the box number in the ad, the name of the paper, and also the local address of office to which reply is sent.

36th St., at 10th Ave.	New York
935 Real Estate Trust Bldg.,	Philadelphia
657 Leader-News Bldg.,	Cleveland
1570 Old Colony Bldg.,	Chicago
519 Newhouse Bldg.,	Salt Lake City
501 Rialto Bldg.,	San Francisco

**WHEN ADVERTISING MACHINERY**, use your own name and address—or a local address of some kind—so that the readers can wire direct and get quick replies. We advise also that you state in your advertisement the present location of plant that is offered for sale, or point of delivery provided you are in the market for equipment.

**TO SIGN YOUR NAME** and address to your advertisement begets the confidence of the reader and facilitates receiving replies. You can, however, obviate delay in receiving answers by signing your ad. only with initials (your own or others), care of your home, your office or a post-office box number in your city.

### POSITIONS VACANT

**EXPERIENCED** car barn foreman wanted for interurban road. Must be able to handle men and capable of planning work with some experience in armature winding. In reply, state experience with possible time of reporting for duty. Address Supt. of Railways, Bartlesville Interurban Railway, Bartlesville, Oklahoma.

**EXPERIENCED** instructor wanted for city and interurban motormen on road located in Middle West operating 200 cars and 8 electric locomotives with automatic air and type M and HL control. State age, experience and salary expected. P-357, Elec. Ry. Journal, Chicago.

**HIGH-GRADE** master mechanic wanted for street railway system in Texas city of 25,000. P-342, Elec. Ry. Journal, Chicago.

**ONE** armature winder wanted. Tulsa Street Railway Co., Tulsa, Oklahoma.

**STEAM** engineer wanted, capable of taking full charge of electric light plant and pumping station, one 500 kilowatt and one 1000 kilowatt Allis-Chalmers turbines. City, 7000 population, located in the Middle West. Salary to start, \$1,800. P-354, Elec. Ry. Journal, Chicago.

**THREE** armature winders wanted. Michigan Railway Co., Albion, Mich.

### POSITIONS WANTED

**COMPETENT** stores man, clear record, desires connection with electrically operated road. Especially qualified to reorganize and systematize general stores department. PW-358, Elec. Ry. Journal, Chicago.

**ENGINEER** maintenance of way and construction engineer, technical, 15 years' experience street and interurban railways, all types track construction, designs railway structures. Extensive valuations. Age 37, married. References exchanged. PW-348, Elec. Ry. Journal, Chicago.

**ENGINEER**—Railway specialist can be engaged as maintenance of way engineer. Ten years' experience, track, roadway and overhead construction and maintenance; valuation, also public service reports. Technical graduate, at present employed as engineer. M. of W. PW-360, Elec. Ry. Journal.

**ELECTRICAL** engineering graduate, formerly lieutenant in the army, with three years' experience in railway engineering, desires position with electric railway company or on electrification work. PW-359, Elec. Ry. Journal, Chicago.

**MARRIED** man, 9 years experience in claim department of large city and interurban company, wishes to make change. Seeks position as chief or assistant chief claim agent. PW-353, Elec. Ry. Journal, Leader-News Bldg., Cleveland.

**MASTER** mechanic, 15 years' experience in shops of largest city and interurban lines in the country; 34 years old; single; can give best of references. Central states preferred, but will consider reasonable offer from other territory. PW-356, Elec. Ry. Journal, Chicago.

### POSITIONS WANTED

**POSITION** wanted as working barn foreman, single truck road preferred. Can wind armatures, do any kind of wiring and controller repair. 10 years' experience both single and double truck. PW-344, Elec. Ry. Journal, Philadelphia.

**RAILWAY** electrical engineering graduate with testing experience on all types of Westinghouse control desires position. Just returned from overseas serving as naval aviator. PW-350, Elec. Ry. Journal, Chicago.

**WITH** leading consulting engineers for 12 years in responsible charge of administrative and engineering work for electrical utilities. Technical graduate. References unconditional. Available within one month. PW-351, Elec. Ry. Journal.

### U. S. GOVERNMENT SALES

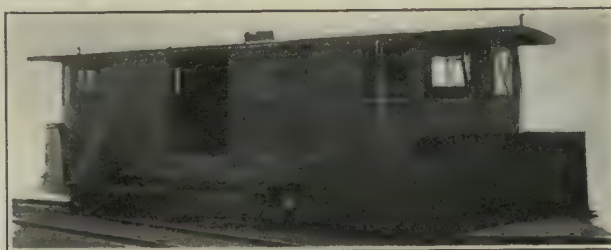
#### Sale of Boilers

**Material Disposition Section** Chemical Warfare Service, U. S. A., 19 West 44th Street, New York City. Sealed bids are requested for either or both of 2 new and unused 604 hp. Babcock & Wilcox Boilers with accessories and breeching; now located at the plant of the Astoria Light, Heat & Power Company, Shore Road & Winthrop Ave., Astoria, L. I. Bids made on Form M. D. 16, obtainable from this office, containing complete information and other details, will be received until 3 p. m. March 11th, 1919.

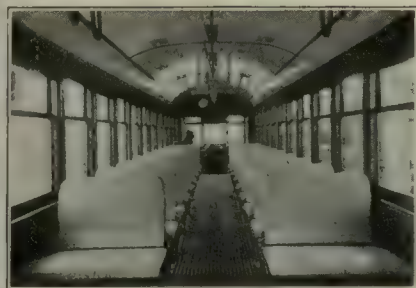




Exterior View



Exterior View



Interior View

## United States Shipping Board Emergency Fleet



Interior View

**BIDS**—For the purchase, f.o.b. cars Philadelphia, of any number of cars up to and including six, will be received by J. W. Smith, Manager Passenger Transportation and Housing Division, United States Shipping Board Emergency Fleet Corporation, No. 140 North Broad Street, Philadelphia.

**Delivery**—Immediate.

**Terms**—25 per cent. sight draft. Balance to be arranged.

**General**—Cars and equipment are entirely new, are open to inspection on request at the works of the manufacturer, the J. G. Brill Company, and cost, as is, \$13,570 each.

### SPECIFICATIONS BODY

Length over anti-climbers.....	45 ft. 6 in.
Length over corner posts.....	33 ft. 0 in.
Length over vestibules.....	44 ft. 2 in.
Extreme width.....	8 ft. 6 in.
Height from rail over trolley board.....	11 ft. 8 in.
Truck centers.....	21 ft. 0 in.
Radius of shortest curve.....	35 ft.
Seating capacity.....	50
Sheathing (sheet steel).....	3/32 in.
Doors, Hand operated	
Headlight, Crouse Hinds "Imperial"	
Registers, International R-7	
Fare Boxes, International G-15	
Heater, 1—Peter Smith Hot Air	
Hand Brakes, National	

### AIR EQUIPMENT

G. E. Straight-Air Compressor C.P.-27

### TRUCKS

Brill 77 E-1	Wheel Base, 5 ft. 9 in.
Diameter of Wheel.....	33 in.
Tread.....	3 in.
Flange.....	3 x 7/8 in.
Axle in Motor Bearing.....	4 1/2 in.
Axle in Gear Seat.....	5 in.
Gauge of Track.....	4 ft. 8 1/2 in.

### MOTOR EQUIPMENT

4—Westinghouse 514 A-600-volt, 40-hp. Motors, double end K-35 G-2 control.  
Solid Gears—58 teeth Pinions—15 teeth

### PERFORMANCE

The free running speed on tangent level track and 525-volt will be 30-31 m.p.h. with car carrying 50 passengers.

### WEIGHT

Light, 42240 With 50 passengers, 49,740

**BIDS**—For the purchase, f.o.b. cars, Philadelphia, of one snow plow will be received by J. W. Smith, Manager, Division of Passenger Transportation and Housing, United States Shipping Board Emergency Fleet Corporation, 140 North Broad Street, Philadelphia.

**Delivery**—Immediate.

**Terms**—25 per cent. sight draft, balance to be arranged.

**General**—The plow and equipment is entirely new, is open to inspection on request, at the works of the manufacturer, the J. G. Brill Company, Philadelphia, and cost, as is, \$13,134.

### SPECIFICATIONS

Length over all.....	41 ft. 4 in.
Length over end body sheathing.....	31 ft. 6 1/2 in.
Length of body inside.....	30 ft. 9 in.
Width over side body sheathing.....	7 ft. 6 in.
Width over body inside.....	6 ft. 8 1/2 in.
Width over all wings closed not to exceed.....	8 ft. 10 in.
Width over all wings open.....	12 ft. 9 in.
Height from bottom of sill to top roof.....	8 ft. 0 in.
Height from top of rail to bottom sill.....	2 ft. 6 1/2 in.
Height of body inside—clear.....	6 ft. 4 in.
Height from top of rail to top of trolley stand.....	10 ft. 9 1/2 in.
Height of share blades.....	5 ft. 0 in.

### DIMENSIONS OF MAIN TIMBERS

Side sills.....	4 1/2 x 11 1/2 in.
Intermediate sills.....	5 x 3 in.
Cross timbers.....	4 x 7 in.
Side posts.....	2 1/2 x 4 in.
Side posts at truss.....	2 1/2 x 5 in.
Flooring, single.....	1 1/2 in.
Lift of plow share.....	6 in.
Lift of digger.....	3 in.
Gauge.....	4 ft. 8 1/2 in.
To operate on curve of.....	35 ft. radius

**AXLE**—Open hearth steel, 4 1/2 x 8-in. journal, 5 1/8-in. wheel fit, 5 1/2-in. gear fit, 5-in. dia. motor fit.

**AIR BRAKES**—Westinghouse Traction Brake Co.'s schedule A M M automatic with graduated release and emergency straight air feature.

- 1—D-2 E G 25-ft. compressor.
- 1—Brake cylinder, 10 x 12 in.
- 2—Main reservoirs, 16 x 42 in.

**DIGGER**—Double truck standard, four per plow, arranged to operate from both ends of plow.

**DRAW BARS**—Special, radial M.C.B. applied as per B/P 6952, to couple with Tomlinson and spring carrier.

**MOTOR EQUIPMENT**—4—Gen. Elect. 201-G, 65-hp.  
2—K-35 G-2 controllers and equipment.  
71-tooth solid gears.  
15-tooth pinions.

**SPREADERS**—12 ft. 0 in. long, furnished by Car Builder.  
**SIDES**—3-in. sheathing.

**TRUCKS**—Brill standard 53-F for 8-wheel plow—4 diggers.

**TRUCK CENTERS**—14 ft. 0 in.

**TRUCK WHEEL BASE**—4 ft. 0 in.

**SHARE LIFTING DEVICE**—Standard pneumatic (air). We furnish and apply 2—8-in. cylinders, 2—1/2-in. engineers valves complete and 1—engineer's handle.

**WHEELS**—33-in. cast iron, 3-in. tread, 1/2-in. flange.

**NOTICE**—Apparatus to be located that motormen will be in R. H. corner and can look out of window.

**WEIGHT**—Complete weight, 56,920 lb.



**IMMEDIATE DELIVERY**

Five new P.A.Y.E. double truck cars. Length, 45-ft. Equipped with 4GE Co.'s 247 Motors and G. E. Co. Air Brakes.

**McGUIRE-CUMMINGS MANUFACTURING CO.**

Cars and Trucks, Snow Sweepers, Electric Locomotives  
111 West Monroe Street, Chicago, Ill.

**Some One Wants to Buy**

the equipment or machinery  
that you are not now using.

This may be occupying valuable  
space, collecting dust, rust and hard  
knocks in your shops and yards.

**Sell it Before depreciation Scraps it.**

*The Searchlight Section is helping others  
—let it help you also.*

805

**RAILS**

15,000 TONS—NEW and RELAYERS  
NEW—12 lb., 16 lb., 20 lb., 25 lb., 30 lb.,  
40 lb., 60 lb., 70 lb., 75 lb., 80 lb., 85  
lb., 90 lb.  
RELAYERS—30 lb., 35 lb., 40 lb., 45 lb.,  
55 lb., 60 lb., 70 lb., 80 lb., 85 lb., 90  
lb., 100 lb.

Fastenings, New Bolts, Nuts and Spikes.  
New Frogs, Switches, Crossings and all  
accessories. Carload and less carload in-  
quiries and orders a specialty. Rails cut  
to lengths for structural purposes. At-  
tractive prices. Immediate shipments from  
stock.

**L. B. FOSTER COMPANY**  
Park Bldg., Pittsburgh, Pa.

CAN SHIP AT ONCE. The following:

**BRIDGES**

good as new. Steel Girder, all Cooper E-35 with  
33% overload allowance.

2—27 ft. 6 in. through plate girder	
1—29 ft. through plate girder	
4—32 ft. 6 in. through plate girder	Total
4—42 ft. 6 in. through plate girder	weight
2—54 ft. 2 in. through plate girder	771,034
2—59 ft. through plate girder	lbs.
1—64 ft. 5 in. through plate girder	
2—64 ft. 5 in. through plate girder	
2—64 ft. 11 in. through plate girder	
1—24 ft. Deck span	Total weight 109,902 lbs.
3—43 ft. Deck span	
2—45 ft. Deck span	Weight 120,479 lbs.
1—111 ft. Truss span	Total
12—30 ft. Deck spans (Viaduct)	weight
2—43 ft. Deck spans (Viaduct)	265,530 lbs.
2—60 ft. Deck spans (Viaduct)	39,170 lbs.
6—Towers and 2 single bents	

**M. K. FRANK**  
Frick Bldg., Pittsburgh, Pa.

**CLEVELAND FEATURE WORKS**

Incorporated  
Cleveland, Ohio

**Everything in the Line  
of Repairs to Electrical  
Machinery**

Complete Armatures, New Armatures,  
Rewound Armature Ceres, Armature  
Shafts, Armature Coils, Fields and  
Commutators.

Established 22 Years

35 Tons  
**7-in. Girder Rails**

P. S. Co. Section No. 238

**HENRY LEVIS & CO.**  
Commercial Trust Bldg., Philadelphia, Pa.

**FOR SALE  
CARS**

2—McKean Gaso-Electric Cars.  
12—Differential 20-yd. Cars.  
5—Gasoline Passenger Cars.  
50—Freight Cars.  
12—Electric Sets.

Get our Lists and Prices  
**J. F. DONAHOO CO.** Birmingham, Ala.

**Cars For Sale**

12 Double Truck Motor or  
Trailers. Brill 27-F trucks,  
28-ft. closed bodies.

**3 SNOW PLOWS**

2 single, 1 double truck

**ELECTRIC EQUIPMENT CO.**  
Commonwealth Bldg. Philadelphia, Pa.

**FOR SALE  
MOTORS**

10—Westinghouse 68 C individual, less gears,  
pinions and gear cases, but all bearings if  
desired. In good mechanical and electrical  
running order. Also 15 K 11 A controllers.

Good condition.

Address W. H. SMAW, Pur. Agt.  
Georgia Ry. & Power Co., Atlanta, Ga.

Keep your eye on the  
Searchlight and your  
advertisements in it.

# Let the "Searchlight" Carry Your Message to SOUTH AMERICA

and to Spanish-speaking Engineers and Industrial Executives everywhere. Through the Searchlight Section of the new  
McGraw-Hill paper

**INGENIERIA INTERNACIONAL**

advertisers can now get in direct touch with Employment, Business and Professional Opportunities in

**South America  
Central America**

**Cuba  
Porto Rico**

**Philippines and  
Spain**

"Searchlight" advertisements will be printed in Spanish—same as the rest of the paper. No charge for translating copy.  
Get your copy in now for the first issue—out this month.

**ADVERTISING RATES:**

Undisplayed Advertisements, 5 cents a word—minimum charge  
\$1.50 an issue. Discounts for consecutive insertions.

Displayed Advertisements at \$5.00 for less per inch per inser-  
tion, depending on the number of inches used. 30 inches to a  
page.





## BOILER BARGAINS

Extraordinary opportunity. Good boilers at the right price. Have been used 6 months to 3 years but all in excellent condition.

Sterlings	253 H. P.
	352 H. P.
	512 H. P.
Edgemoores	600 H. P.
	813 H. P.

We are prepared to supply complete boiler plants including pumps, piping, breaching, stacks, etc.

## Du Pont Chemical Company

Incorporated  
Sales Department  
Wilmington, Delaware

## ROTARY CONVERTERS

- 1—300-kw. Westinghouse Rotary Converter, 3-ph., 60-cy., 370-v. A.C., 575-v. D.C., 600 r.p.m.
- 1—200-kw. Westinghouse Rotary Converter, 3-ph., 60-cy., 370-v. A.C., 575-v. D.C.
- 1—150-kw. Westinghouse Rotary Converter, 2 or 3-ph., 60-cy., 250-v. D.C., 720 r.p.m.

## TURBINE

- 1—500-kw. Westg. Horizontal, 3-ph., 60-cy., 370-v. (can be rewound for any standard voltage), 3600 r.p.m., with or without condensing equipment.

### ARCHER & BALDWIN, INC.

114-118 Liberty St., New York, N. Y.  
Telephone 4337-4338 Rector

## WATER TUBE BOILERS

- 2—981 hp. Edge Moor, 235 lb. pressure.
- 1—450 hp. Heine, 170 lb. pressure.
- 4—400 hp. Stirling, 150 lb. pressure.
- 1—380 hp. Stirling, 150 lb. pressure.
- 2—360 hp. Erie City, 160 lb. pressure.
- 1—310 hp. Stirling, 200 lb. pressure.
- 6—308 hp. Heine, 140 lb. pressure.
- 1—305 hp. Babcock & Wilcox, 160 lb. pressure.
- 12—264 hp. Babcock & Wilcox, 175 lb. pressure.
- 8—250 hp. Stirling, 160 lb. pressure.
- 1—212 hp. Babcock & Wilcox, 160 lb. pressure.
- 2—204 hp. Babcock & Wilcox, 160 lb. pressure.

### MacGovern & Company, Inc.

114 Liberty St., New York, N. Y.  
Pittsburgh Office: 498 Union Arcade Bldg.

We also have

## 2 New 30-ton O & R LOCOMOTIVE CRANES

With 60-foot boom

Tell us what you need and get our quotations. All goods ready for *immediate delivery* subject to prior sale.

Note:—We are compiling an extensive list of machinery, electrical apparatus, mechanical supplies, tools and structural material of all kinds which we have for sale. If you desire to receive this list, when printed, please file with us your name and address.



## 3—One-Man Cars

Brill Semi-Convertible with Brill 21-E Single Trucks or Maximum Traction Trucks. Length over corner posts 20 ft. 8 in. Length over bumpers 33 ft. 10 in. Extreme width 8 ft. 3 in. Reversible cross slat seats 33 in. wide. Westinghouse air brakes. Code "Colon."

### TRANSIT EQUIPMENT COMPANY

501 Fifth Avenue, New York



# WHAT AND WHERE TO BUY

Equipment, Apparatus and Supplies Used by the Electric Railway Industry with  
Names of Manufacturers and Distributors Advertising in this Issue

**Advertising, Street Car**  
Collier, Inc., Barron G.

**Air Rectifiers**  
Holden & White, Inc.

**Amusement Devices**  
Este Co., The J. D.

**Anchors, Guy**  
Electric Service Supplies Co.  
Holden & White, Inc.  
Johns-Manville Co., H. W.  
Ohio Brass Co.  
Westinghouse Elec. & M. Co.

**Anti-Climbers**  
Railway Improvement Co.

**Ash Storage Tanks, Cast Iron**  
Green Engineering Co.

**Automobiles and Buses**  
Brill Co., The J. G.

**Axle Straighteners**  
Columbia M. W. & M. I. Co.

**Axles, Car Wheel**  
Bemis Car Truck Co.  
Brill Co., The J. G.  
Cambria Steel Co.  
Carnegie Steel Co.  
Midvale Steel & Ordnance Co.  
National Railway Appliance Co.  
St. Louis Car Co.  
Standard Steel Works Co.  
Westinghouse Elec. & M. Co.

**Babbling Devices**  
Columbia M. W. & M. I. Co.

**Badges and Buttons**  
Electric Service Supplies Co.  
International Register Co., The

**Batteries, Dry**  
Johns-Manville Co., H. W.  
Nichols-Lantern Co.

**Batteries, Storage**  
Electric Storage Battery Co.

**Bearings and Bearing Metals**  
Bemis Car Truck Co.  
Columbia M. W. & M. I. Co.  
Eureka Co.  
General Electric Co.  
More-Jones Brass & Metal Co.  
St. Louis Car Co.  
Westinghouse Elec. & M. Co.

**Bearings, Center and Roller Side**  
Holden & White, Inc.

**Bearings, Oilless, Graphite & Bronze**  
Bound Brook Oilless Bearing Co.

**Bearings, Roller and Ball**  
Gurney Ball-Bearing Co.

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Brill Co., The J. G.  
Columbia M. W. & M. I. Co.  
Electric Service Supplies Co.  
St. Louis Car Co.

**Benders, Rail**  
Niles-Bement-Pond Co.  
Zelnicker, Walter A., Supply Co., Inc.

**Boilers**  
Babcock & Wilcox Co.

**Boiler Cleaning Compounds**  
Johns-Manville Co., H. W.

**Boiler Coverings**  
Johns-Manville Co., H. W.

**Boiler Tubes**  
National Tube Co.

**Bond Testers**  
American Steel & Wire Co.  
Lincoln Bonding Co.

**Bonding Apparatus**  
American Steel & Wire Co.  
Electric Railway Improvement Co.  
Electric Service Supplies Co.  
Lincoln Bonding Co.  
Ohio Brass Co.

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American Steel & Wire Co.  
Electric Railway Improvement Co.  
Electric Service Supplies Co.  
General Electric Co.  
Johns-Manville Co., H. W.  
Lincoln Bonding Co.  
Ohio Brass Co.  
Westinghouse Elec. & M. Co.

**Book Publishers**  
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**Rate-Climbers**  
Railway Improvement Co.

**Boring Tools, Car Wheel**  
Niles-Bement-Pond Co.

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Bates Expanded Steel Truss Co.  
Hubbard & Co.  
Linsley Bros. Co.  
Ohio Brass Co.

**Brake Adjusters**  
Holden & White, Inc.  
Westinghouse Traction Brake Co.

**Brake Shoes**  
Amer. Brake Shoe & Fdry. Co.  
Barbour-Stockwell Co.  
Brill Co., The J. G.  
Columbia M. W. & M. I. Co.  
St. Louis Car Co.

**Brakes, Brake Systems and Brake Parts**  
Allis-Chalmers Mfg. Co.  
Bemis Car Truck Co.  
Brill Co., The J. G.  
Columbia M. W. & M. I. Co.  
General Electric Co.  
Holden & White, Inc.  
National Brake Co.  
St. Louis Car Co.  
Safety Car Devices Co.  
Westinghouse Trac. B. Co.

**Brick, Fire**  
Green Engineering Co.

**Bridges and Buildings**  
American Bridge Co.

**Brooms, Track, Steel or Rattan**  
Zelnicker, Walter A., Supply Co., Inc.

**Brushes, Carbon**  
General Electric Co.  
Jeandron, W. J.  
Morgan Crucible Co.  
National Carbon Co., Inc.  
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**Brushes, Graphite**  
United States Graphite Co.

**Brush Holders**  
Anderson Mfg. Co., A. & J. M.  
Columbia M. W. & M. I. Co.  
Eureka Co.

**Buckets**  
Blaw-Knox Company

**Bunkers, Coal**  
American Bridge Co.

**Bushings, Case Hardened & Man-ganese**  
Bemis Car Truck Co.

**Bushings, Graphite & Wooden**  
Bound Brook Oilless Bearing Co.

**Cables. (See Wires and Cables.)**

**Carbon Brushes. (See Brushes, Carbon.)**

**Car Equipment. (For Fenders, Heaters, Registers, Wheels, etc.—See those headings.)**

**Car Trimmings. (For Curtains, Registers, Doors, Seats, etc.—See those headings.)**

**Car Panel Safety Switches**  
Westinghouse Elec. & Mfg. Co.

**Cars, Passenger, Freight, Express, etc.**

American Car Co.  
Brill Co., The J. G.  
Cambria Steel Co.  
Kuhlman Car Co., G. C.  
McGuire-Cummings Mfg. Co.  
Midvale Steel & Ordnance Co.  
St. Louis Car Co.  
Wason Mfg. Co.

**Cars, Second Hand**  
Electric Equipment Co.

**Cars, Self-Propelled**  
Electric Storage Battery Co.  
General Electric Co.

**Castings, Brass, Composition or Copper**  
Anderson Mfg. Co., A. & J. M.  
Columbia M. W. & M. I. Co.  
Eureka Co.  
More-Jones Brass & Metal Co.

**Castings, Gray Iron and Steel**  
American Bridge Co.  
Bemis Car Truck Co.  
Columbia M. W. & M. I. Co.  
St. Louis Car Co.  
Standard Steel Works Co.

**Castings, Malleable and Brass**  
Amer. Brake Shoe & Fdry. Co.  
Bemis Car Truck Co.  
Columbia M. W. & M. I. Co.  
St. Louis Car Co.

**Catchers and Retrievers, Trolley**  
Electric Service Supplies Co.  
Holden & White, Inc.  
Ohio Brass Co.  
Wood Co., Chas. N.

**Change Carriers**  
McGill Ticket Punch Co.

**Circuit Breakers**  
Automatic Reclosing Circuit Breaker Co.  
The Cutter Electrical & Mfg. Co.  
General Electric Co.  
Westinghouse Elec. & Mfg. Co.

**Clamps and Connectors for Wires and Cables**  
Anderson Mfg. Co., A. & J. M.  
Electric Service Supplies Co.  
General Electric Co.  
Hubbard & Co.  
Ohio Brass Co.  
Westinghouse Elec. & Mfg. Co.

**Cleaners and Scrapers Track—(See also Snow-Plows, Sweepers and Brooms.)**  
Brill Co., The J. G.  
Ohio Brass Co.

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General Electric Co.

**Coal and Ash Handling—(See Con-veying and Hoisting Machin-ery.)**

**Coasting Recorders**  
Railway Improvement Co.

**Coll Banding and Winding Ma-chines**  
Columbia M. W. & M. I. Co.  
Electric Service Supplies Co.

**Colls, Armature and Field**  
Cleveland Armature Works.  
Columbia M. W. & M. I. Co.  
D & W Fuse Co.  
General Electric Co.  
Independent Lamp & Wire Co.  
Rome Wire Co.  
Westinghouse Elec. & M. Co.

**Colls, Choke and Kicking**  
Electric Service Supplies Co.  
General Electric Co.  
Westinghouse Elec. & M. Co.

**Coin-Counting Machines**  
International Register Co., The

**Commutator Slotters**  
Electric Service Supplies Co.  
General Electric Co.  
Westinghouse Elec. & Mfg. Co.  
Wood Co., Chas. N.

**Commutator Truing Devices**  
General Electric Co.

**Commutators or Parts**  
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Columbia M. W. & M. I. Co.  
Eureka Co.  
General Electric Co.  
Westinghouse Elec. & Mfg. Co.

**Compressors, Air**  
Allis-Chalmers Mfg. Co.  
Chicago Pneumatic Tool Co.  
General Electric Co.  
Westinghouse Trac. B. Co.

**Concrete Mixers**  
Blaw-Knox Co.

**Condensers**  
Allis-Chalmers Mfg. Co.  
General Electric Co.  
Westinghouse Elec. & Mfg. Co.

**Conduits, Underground**  
Johns-Manville Co., H. W.

**Connectors, Solderless**  
Westinghouse Elec. & Mfg. Co.

**Controller Fingers**  
Trigger Lock Reversible Controller Finger

**Controller Regulators**  
Electric Service Supplies Co.

**Controllers or Parts**  
Allis-Chalmers Mfg. Co.  
Columbia M. W. & M. I. Co.  
General Electric Co.  
Johns-Manville Co., H. W.  
Westinghouse Elec. & Mfg. Co.

**Controlling Systems**  
General Electric Co.  
Westinghouse Elec. & Mfg. Co.

**Converters, Rotary**  
Allis-Chalmers Mfg. Co.  
General Electric Co.  
Westinghouse Elec. & Mfg. Co.

**Conveying and Hoisting Machinery**  
American Bridge Co.  
Columbia M. W. & M. I. Co.  
Green Engrg. Co.

**Conveyors, Belt**  
Portable Machinery Co.

**Conveyors, Coal and Ash**  
Portable Machinery Co.

**Conveyors, Portable**  
Portable Machinery Co.

**Cord, Bell, Trolley, Register, etc.**  
Brill Co., The J. G.  
Electric Service Supplies Co.  
International Register Co., The  
Samson Cordage Works.

**Cord Connectors and Couplers**  
Electric Service Supplies Co.  
Samson Cordage Works.  
Wood Co., Chas. N.

**Couplers, Car**  
Brill Co., The J. G.  
Ohio Brass Co.  
Van Dorn Coupler Co.  
Westinghouse Trac. B. Co.

**Cranes**  
Allis-Chalmers Mfg. Co.  
Toledo Bridge & Crane Co., The

**Creosoting. (See Wood Preserva-tives)**

**Cross Arms. (See Brackets)**

**Crossing Foundations**  
International Steel Tie Co.

**Crossing Signals. (See Signals, Crossing)**

**Crossings, Track. (See Track, Special Work)**

**Culverts**  
Armco Iron Culvert & Flume Mfrs. Assn.  
Canton Culvert & Slio Co.

**Curtains and Curtain Fixtures**  
Brill Co., The J. G.  
Electric Service Supplies Co.  
St. Louis Car Co.

**Cutting Apparatus, Oxy-Acetylene**  
Milburn Co., The. Alex.

**Dealers' Machinery**  
Archer & Baldwin  
Cleveland Armature Wks.  
Electric Equipment Co.  
Foster Co., L. B.  
Griswold Machine Co., Geo. M.  
Hyman Michaels Co.  
MacGovern & Co., Inc.  
Zelnicker Supply Co., Inc., Walter A.

**Derailing Devices. (See also Track Work)**  
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**Destination Signs**  
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Electric Service Supplies Co.

**Detective Service**  
Wish Service, Inc., P. Edward.

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Williams & Co., J. H.

**Door Operating Devices**  
Consolidated Car Heating Co.  
National Pneumatic Co., Inc.  
Safety Car Devices Co.

**Doors and Door Fixtures**  
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General Electric Co.  
Hale & Kilburn Corp.

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Johns-Manville Co., H. W.

**Doors, Folding Vestibule**  
National Pneumatic Co., Inc.

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Zelnicker Supply Co., Walter A. Inc.

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Roebbling's Sons Co., J. A.

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Archbold-Brady Co.  
Arnold Co., The  
Byllesby & Co., H. M.  
Ford, Bacon & Davis  
Holst, Eberhardt W.  
Republic Engineers, Inc.  
Richey, Albert S.  
Sanderson & Porter.  
Scotfield Engineering Co.  
Stone & Webster.  
Wells, Gardiner F.  
White Companies, The J. G.  
Woodmansee & Davidson Engineering Co.

**Engines, Gas and Oil**  
Allis-Chalmers Mfg. Co.  
Westinghouse Elec. & Mfg. Co.

**Engines, Steam**  
Allis-Chalmers Mfg. Co.  
Westinghouse Elec. & Mfg. Co.

**Fare Boxes**  
Brill Co., The J. G.  
Cleveland Fare Box Co.  
International Register Co., The  
National Railway Appliance Co.

**Fences, Woven Wire and Fence Posts**  
American Steel & Wire Co.  
Page Steel & Wire Co.

**Fenders and Wheel Guards**  
Brill Co., The J. G.  
Cleveland Fare Box Co.  
Electric Service Supplies Co.  
Star Brass Works.

**Fibre and Fibre Tubing**  
Johns-Manville Co., H. W.  
Westinghouse Elec. & Mfg. Co.

**Field Cols. (See Cols)**

**Filters, Water**  
Scaife & Sons Co., Wm. B.

**Fire Extinguishing Apparatus**  
Johns-Manville Co., H. W.

**Fire-Proofing Materials**  
Johns-Manville Co., H. W.

**Floodlights**  
Electric Service Supplies Co.

**Flooring Composition**  
American Mason Safety Tread Co.  
Johns-Manville Co., H. W.

**Forgings**  
Eureka Co.  
Standard Steel Works Co.  
Williams & Co., J. H.

**Frogs, Track. (See Track Work)**

**Furnaces. (See Stokers)**

**Fuses and Fuse Boxes**  
Columbia M. W. & M. I. Co.  
D & W Fuse Co.  
General Electric Co.  
Johns-Manville Co., H. W.  
Westinghouse Elec. & Mfg. Co.

**Fuses, Refillable**  
Columbia M. W. & M. I. Co.  
General Electric Co.

**Galvanizing**  
Cattle, Jos. P., & Bros.

**Gaskets**  
Johns-Manville Co., H. W.  
Power Specialty Co.  
Westinghouse Traction Brake Co.

**Gas Producers**  
Westinghouse Elec. & Mfg. Co.

**Gates, Car**  
Brill Co., The J. G.

**Gages, Oil and Water**  
Ohio Brass Co.

**Gear Blanks**  
Carnegie Steel Co.  
Standard Steel Works Co.

**Gear Cases**  
Columbia M. W. & M. I. Co.  
Electric Service Supplies Co.  
Westinghouse Elec. & Mfg. Co.

**Gears and Pinions**  
Columbia M. W. & M. I. Co.  
Electric Service Supplies Co.  
National Railway Appliance Co.  
Nuttall Co., R. D.

**Generating Sets, Gas-Electric**  
General Electric Co.

**Generators**  
Allis-Chalmers Mfg. Co.  
General Electric Co.  
Westinghouse Elec. & Mfg. Co.

**Goggles, Safety**  
Standard Optical Co.

**Gongs. (See Bells and Gongs)**

**Graphite**  
Morgan Crucible Co.

**Greases. (See Lubricants)**

**Grinders and Grinding Supplies**  
Indianapolis Switch & Frog Co.  
Metal & Thermit Corp.  
Railway Track-work Co.

**Grinding Blocks and Wheels**  
Railway Track-work Co.

**Guards, Cattle**  
American Bridge Co.

**Guards, Trolley**  
Electric Service Supplies Co.  
Ohio Brass Co.

**Harps, Trolley**  
Anderson M. Co., A. & J. M.  
Electric Service Supplies Co.  
More-Jones B. & M. Co.  
Nuttall Co., R. D.  
Star Brass Works.

**Headlights**  
Electric Service Supplies Co.  
General Electric Co.  
Ohio Brass Co.  
St. Louis Car Co.

**Heaters, Car (Electric)**  
Consolidated Car Heating Co.  
Gold Car Heating & Lighting Co.  
Holden & White, Inc.  
Smith Heater Co., Peter.

**Heaters, Car, Hot Air and Water**  
Cooper Heater Co.  
Holden & White, Inc.  
Smith Heater Co., Peter.

**Heaters, Car (Stove)**  
Electric Service Supplies Co.  
Holden & White, Inc.  
Smith Heater Co., Peter.

**Holsts and Lifts**  
Columbia M. W. & M. I. Co.  
Ford Chain Block & Mfg. Co.  
Niles-Bement-Pond Co.  
Toledo Bridge & Crane Co., The

**Hose, Bridges**  
Ohio Brass Co.

**Hose, Pneumatic and Fire**  
Johns-Manville Co., H. W.  
Westinghouse Traction Brake Co.

**Hydraulic Machinery**  
Allis-Chalmers Mfg. Co.  
Niles-Bement-Pond Co.

**Inspection**  
Electrical Testing Lab's.

**Instruments, Measuring, Testing and Recording**  
Economy Electric Devices Co.  
General Electric Co.  
Johns-Manville Co., H. W.  
Westinghouse Elec. & Mfg. Co.  
Weston Elec'l Instrument Co.

**Insulating Cloth, Paper and Tape**  
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Johns-Manville Co., H. W.  
Standard Woven Fabric Co.  
U. S. Rubber Co.  
Westinghouse Elec. & Mfg. Co.

**Insulation. (See also Paints)**  
Anderson M. Co., A. & J. M.  
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Electric Service Supplies Co.  
General Electric Co.  
Holden & White, Inc.  
Johns-Manville Co., H. W.  
Mitchell-Rand Mfg. Co.  
U. S. Rubber Co.  
Westinghouse Elec. & Mfg. Co.

**Insulators. (See also Line Material)**  
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General Electric Co.  
Johns-Manville Co., H. W.  
Ohio Brass Co.  
Westinghouse Elec. & Mfg. Co.

**Insulator Pins**  
Electric Service Supplies Co.  
Hubbard & Co.

**Jacks. (See also Cranes, Hoists and Lifts)**

Brill Co., The J. G.  
Buckeye Jack Mfg. Co.  
Columbia M. W. & M. I. Co.  
National Ry. Appliance Co.  
Templeton, Kenly Co., Ltd.

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Carnegie Steel Co.  
Zelnicker Supply Company, Inc., Walter A.

**Journal Boxes**  
Bemis Car Truck Co.  
Brill Co., J. G.

**Junction Boxes**  
Johns-Manville Co., H. W.

**Laboratory**  
Electrical Testing Lab's.

**Lamp Guards and Fixtures**  
Anderson M. Co., A. & J. M.  
Electric Service Supplies Co.  
General Electric Co.  
Westinghouse Elec. & Mfg. Co.

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Westinghouse Elec. & Mfg. Co.

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Niles-Bement-Pond Co.

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Holden & White, Inc.

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Electric Service Supplies Co.  
General Electric Co.  
Ohio Brass Co.  
Westinghouse Elec. & Mfg. Co.

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Milburn Co., The Alex.

**Line Material. (See also Brackets, Insulators, Wires, etc.)**  
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Electric Service Supplies Co.  
Eureka Co.  
General Electric Co.  
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Hubbard & Co.  
Johns-Manville Co., H. W.  
More-Jones B. & M. Co.  
Ohio Brass Co.  
Westinghouse Elec. & Mfg. Co.

**Locomotives, Electric**  
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General Electric Co.  
McGuire-Cummings Mfg. Co.  
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Galena-Signal Oil Co.

**Lumber. (See Poles, Ties, etc.)**

**Machine Tools**  
Columbia M. W. & M. I. Co.

**Machine Work**  
Columbia M. W. & M. I. Co.  
Holden & White, Inc.

**Mats**  
Johns-Manville Co., H. W.

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Economy Electric Devices Co.

**Meters. (See Instruments)**  
Electric Service Supplies Co.  
Wood Co., Chas. N.

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Drew Elec. & Mfg. Co.

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Westinghouse Elec. & Mfg. Co.

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Lincoln Bonding Co.

**Nuts and Bolts**  
Allis-Chalmers Mfg. Co.  
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Bemis Car Truck Co.  
Columbia M. W. & M. I. Co.  
Hubbard & Co.

**Oils. (See Lubricants)**

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Johns-Manville Co., H. W.  
Power Specialty Co.  
U. S. Rubber Co.  
Westinghouse Traction Brake Co.

**Packing Rings**  
Johns-Manville Co., H. W.

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**Paving Material**  
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Barrett Co., The

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Electric Service Supplies Co.  
Ohio Brass Co.

**Pinion Pullers**  
Columbia M. W. & M. I. Co.  
Electric Service Supplies Co.  
General Electric Co.  
Wood Co., Chas. N.

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Electric Service Supplies Co.  
Ohio Brass Co.  
Westinghouse Traction Brake Co.

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Standard Steel Works Co.  
Westinghouse Traction Brake Co.

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Hubbard & Co.

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Nuttall Co., R. D.

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Economy Electric Devices Co.  
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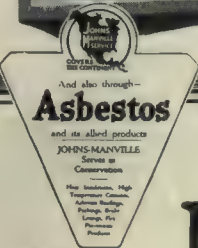
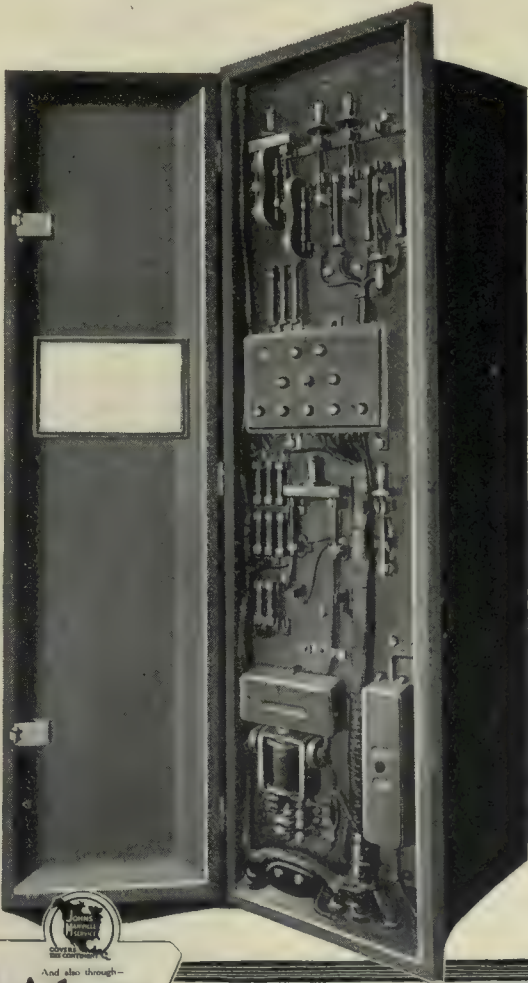
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**Rail Welding.** (See Brazing and Welding Processes)

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Zelnicker, Walter A., Supply Co., Inc.

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Exell Mfg. Co., The  
International Register Co., The  
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Electric Service Supplies Co.

**Repair Work.** (See also Coils)  
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Columbia M. W. & M. I. Co.  
General Electric Co.  
Independent Lamp & Wire Co.  
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Electric Service Supplies Co.

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**Resistance, Wire and Tube**  
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**Retrievers, Trolley.** (See Catchers and Retrievers, Trolley)

**Rheostats**  
General Electric Co.  
Westinghouse Elec. & Mfg. Co.

**Roofing, Building**  
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Johns-Manville Co., H. W.

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Columbia M. W. & M. I. Co.  
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Holden & White, Inc.  
Nicholas-Lintern Co.  
Ohio Brass Co.  
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**Sash Fixtures, Car**  
Brill Co., The J. G.

**Sash Metal, Car Window**  
Hale & Kilburn Corp

**Scrapers, Track.** (See Cleaners and Scrapers, Track)

**Seats, Car.** (See also Rattan)  
Brill Co., The J. G.  
Hale & Kilburn Corp.  
St. Louis Car Co.

**Second-Hand Equipment**  
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Cleveland Armature Wks.  
Duquesne Elec. & Mfg. Co.  
Electric Equipment Co.  
Exell Mfg. Co., The  
Foster Co., L. B.  
Griswold Machine Co., G. M.  
Hyman Michaels Co.  
MacGovern & Co., Inc.  
Zelnicker Supply Co., W. A.

**Shades, Vestibule**  
Brill Co., The J. G.

**Shovels**  
Hubbard & Co.

**Shovels, Power**  
Blaw-Knox Co.

**Signals, Car Marker**  
Nicholas-Lintern Co.

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Electric Service Supplies Co.  
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Federal Signal Co.  
Nachod Signal Co., Inc.  
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Wood Co., Chas. N.

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Nachod Signal Co., Inc.  
U. S. Electric Signal Co.

**Slack Adjusters**  
(See Brake Adjusters)

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Anderson Mfg. Co., A. & J. M.  
Columbia M. W. & M. I. Co.  
Drew Electric & Mfg. Co.  
Holden & White, Inc.  
More-Jones Brass & Metal Co.  
Nuttall Co., R. D.

**Snow-Plows, Sweepers and Brooms**  
Brill Co., The J. G.  
Columbia M. W. & M. I. Co.  
McGuire-Cummings Mfg. Co.

**Soldering and Brazing Apparatus**  
(See Welding Processes and Apparatus)

**Speed Indicators**  
Johns-Manville Co., H. W.

**Spikes**  
American Steel & Wire Co.

**Splicing Compounds**  
Johns-Manville Co., H. W.  
Standard Woven Fabric Co.  
U. S. Rubber Co.  
Westinghouse Elec. & Mfg. Co.

**Splicing Sleeves.** (See Clamps and Connectors)

**Springs, Car and Truck**  
American Steel & Wire Co.  
Bemis Car Truck Co.  
Brill Co., The J. G.  
Standard Steel Works Co.

**Sprinklers, Track and Road**  
Brill Co., The J. G.  
McGuire-Cummings Mfg. Co.  
St. Louis Car Co.

**Steps, Car**  
American Mason Safety Tread Co.  
Universal Safety Tread Co.

**Stokers, Mechanical**  
Babcock & Wilcox Co.  
Green Engrg. Co.  
Westinghouse Elec. & Mfg. Co.

**Storage Batteries.** (See Batteries, Storage)

**Strand**  
Roebbling's Sons Co., J. A.

**Straps, Car, Sanitary**  
Holden & White, Inc.  
Railway Improvement Co.

**Structural Iron.** (See Bridges)

**Superheaters**  
Babcock & Wilcox Co.  
Power Specialty Co.

**Sweepers, Snow.** (See Snow Plows, Sweepers and Brooms)

**Switch Stands**  
Indianapolis Switch & Frog Co.  
Rampolo Iron Works

**Switches, Lock**  
Weiss Switch Lock Co.

**Switches, Track.** (See Track Special Work)

**Switches and Switchboards**  
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Electric Service Supplies Co.  
General Electric Co.  
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**Tampers, Tie**  
Ingersoll-Rand Co.

**Tanks, Ash and Cold Storage**  
Green Engineering Co.

**Tapes and Cloths.** (See Insulating Cloths, Paper and Tape)

**Telephones and Parts**  
Electric Service Supplies Co.

**Testing, Commercial and Electrical**  
Elec'l Testing Laboratories

**Testing Instruments.** (See Instruments, Electrical Measuring, Testing, etc.)

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Consolidated Car Heating Co.  
Gold Car Heating & Lighting Co.  
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Williams & Co., J. H.

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Electric Service Supplies Co.

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**Ties and Tie Rods, Steel**  
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Carnegie Steel Co.  
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Columbia M. W. & M. I. Co.  
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Hubbard & Co.  
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Universal Safety Tread Co.

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Electric Service Supplies Co.  
General Electric Co.  
Holden & White, Inc.  
More-Jones Brass & Metal Co.  
National Railway Appliance Co.  
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Brill Co., The J. G.  
McGuire-Cummings Mfg. Co.  
St. Louis Car Co.

**Tubing, Steel**  
National Tube Co.

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General Electric Co.  
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Allis-Chalmers Mfg. Co.

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## WE REFER YOU TO THE U. S. GOVERNMENT

In 18 months' time we have undertaken and completed work for the American Government close to \$100,000,000.

In these construction and engineering operations the vital, life-and-death consideration was *TIME*.

On the Upton Cantonment, at Yaphank, we transformed a wooded wilderness into a city in 90 days.

At the big Government Explosives Plant, at Nitro, West Virginia, we built 3000 buildings at an average speed of one every thirty minutes.

What we have done for the Government we can do for you.

*Our Advice is as Good as Our Service*

THOMPSON - STARRETT COMPANY

CHICAGO

INDUSTRIAL CONSTRUCTION - NEW YORK

PITTSBURGH







**ARROW**  
 Washed Handkerchiefs  
 Clean, Soft, Laundered  
 Ready for use  
 In Germ-proof packages  
 CLUETT, PEABODY & CO., Inc. MAKERS




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National advertisers will NOT use car card space that does not pay them. And no contractor for your space can maintain a permanent income from it unless he makes the space pay the advertiser. SUCCESS in these progressive days means ORGANIZATION. Because we have this Organization is the reason why signing a Collier Contract automatically insures a stabilized income from your car card space.

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# GURNEY

## BALL BEARINGS

### on SAFETY CARS

The eighteen new Safety Cars of the Houston Electric Company are equipped with Gurney Ball Bearing Journals.

These cars have gone into high-grade city service under conditions where every possible revenue mile is desired, as there are few safety cars for spares.

That means cars that won't have to be laid up regularly every few days for lubrication, or almost any time because of a hot box.

Such cars are cars equipped with Gurney Ball-Bearing Journals, whether they are safety Cars or any other kind found in the whole domain of electric railroading.

*Avail yourself of Gurney Engineering Service. We are experts in Ball Bearing Engineering.*

## GURNEY BALL BEARING CO.

Conrad Patent Licensee

Chicago, Ill. JAMESTOWN, N. Y. New York, N. Y.







## What the Birney Safety Car Has Taught

"Who'd have thought that one man could run a car more safely than two men, that a small car could make faster running time than a big car, that a light car is better than a heavy one, that all these safety devices make the motorman's job simpler and easier than it used to be."

"These Birney Safety cars certainly have taught us a lot."

**E**VIDENCE keeps accumulating that Birney Safety Cars are doing all that was expected of them and then some.

They win the public from the start and the goodwill grows stronger daily. Safety, frequency, faster schedules are big factors with car riders.

The operators prefer them to other cars. They like them because they are safer, quicker and easier

to handle. And they are naturally affected by the satisfaction passengers show.

The Birney Safety Car makes a strong appeal to managers from every viewpoint. It is a traffic builder. It fits into every condition. It is economical to operate and maintain. And all the better service it furnishes is accompanied by the utmost safety possible to street railway transportation.

*Write Today for Complete Information.*

THE J. G. BRILL COMPANY  
PHILADELPHIA, PA.

G. C. KUHLMAN CAR CO.  
CLEVELAND, OHIO



AMERICAN CAR COMPANY  
ST. LOUIS, MO.

WASON MANUFACTURING CO.  
SPRINGFIELD, MASS.



## The Reasons

The low cost of maintaining G-E electric locomotives is a matter of common knowledge and published record. The reasons for this economical feature are:

Expert Mechanical and Electrical Design  
High Grade Materials  
Skilled Workmanship and  
Thorough Testing before shipment.

A typical installation of heavy freight and passenger locomotives is the equipment of the Butte, Anaconda & Pacific Railway, including 28—80-ton, 2400-Volt D. C. locomotives put in service as follows:

1913.....	17
1915.....	5
1917.....	6

The entire electrical equipment of the 28 locomotives is maintained by three electrical workers who also perform other electrical work.



# GENERAL ELECTRIC COMPANY

Sales Offices in all large cities.  
General Office, Schenectady, N.Y.



# ELECTRIC RAILWAY JOURNAL

Nine out of twenty-six  
shop operations are  
inspections

THAT'S why you can count on the performance of every S K F Ball Bearing. From the rigid examination of raw materials to the final inspection of the finished bearing—all through the making of S K F Ball Bearings there is a constant checking up and affirming.

From a manufacturing standpoint all this is necessary for economical production. Yet in a broader sense, it must mean longer and better service from every S K F bearing you use.

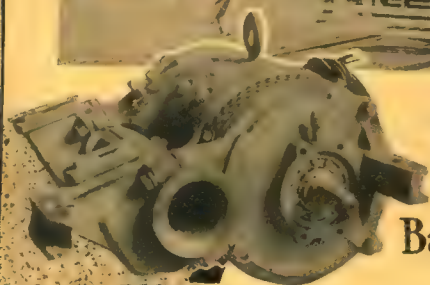
**SKF BALL BEARING CO.**

HARTFORD, CONN.



# SKF





No. 506 Motor  
Showing Ball Bearings

**No. 506 Motors**  
with either  
Ball or Sleeve Armature Bearings  
for



No. 506 Motor  
Showing Sleeve Bearings

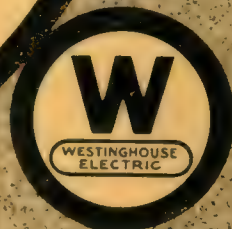
## **Safety Cars**

### **Safety Car Facts:**

Six old two-man cars on 12 minute headway, and thirteen old two-man cars on 6 minute headway were replaced by six Birney cars on 8 minute headway, and sixteen Birney cars on 4 minute headway, bringing out an increase in gross returns of from \$2100 to \$3500.

With reasonable increase in fare and these economies, roads can operate.

Westinghouse Electric & Manufacturing Co.  
East Pittsburgh, Pa.



# **Westinghouse**



# Electric Railway Journal

H. W. BLAKE, Editor

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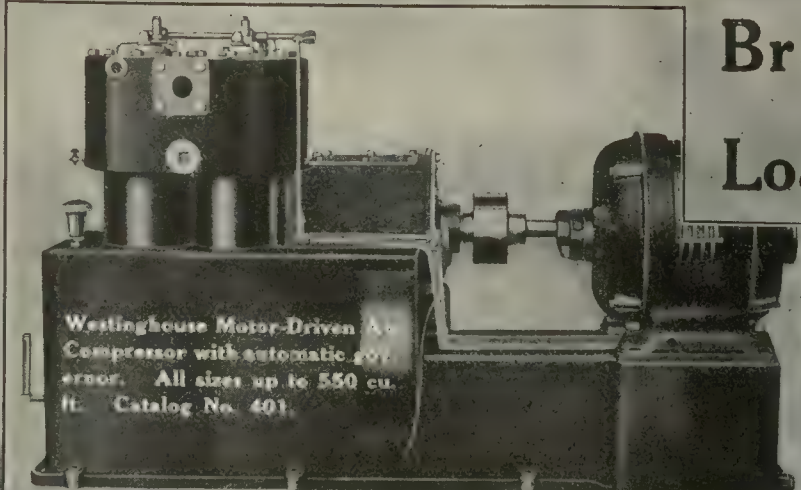
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## Brake Testing on Loading Tracks

Cars being loaded on freight house tracks offer an excellent opportunity for the inspector to test and condition the air brakes before the cars are switched into the train and sent on their journey. Train detentions, due to neglected air brakes, will be largely reduced if an air compressor be installed in the freight house and the loading tracks be piped to carry air to the cars.

### **Westinghouse Electrically-Driven Air Compressors, Being Compact, Efficient and Durable,**

are specially suited to air brake testing plants of all kinds and sizes, and particularly to those isolated plants which require compressors automatically controlled, of thorough reliability, and which need little attention to operate and maintain.

## **Westinghouse Traction Brake Company**

General Offices and Works, Wilmerding, Pa.

Atlanta, Ga.  
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Pittsburgh, Pa.

San Francisco.  
Seattle, Wash.  
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St. Paul, Minn.



THOUSANDS OF KILOWATTS

10  
9  
8  
7  
6  
5  
4  
3  
2  
1

*The Westinghouse  
Underfeed Stoker  
is built for*

## ***Calm or Storm In Power House Load***

The ease with which it takes the crest of the central station peak, denotes—

### **A Wide Operating Range and Great Elasticity of Operation**

If the load served is constant, without the daily peaks, the enormous overload capacity of the Westinghouse Underfeed Stoker stands as a RESERVE to be utilized in any emergency, or as natural business growth calls for additional steaming capacity.

There is no stoker on which higher efficiency can be made over its entire operating range.

There is no stoker which will burn a wider variety of fuels more satisfactorily.

Remember however, that the choice of a stoker always narrows down to a study of individual plant requirements, and when all things are considered—such as foundations, headroom limitations, first cost, etc., the choice may point to the Westinghouse Roney, or the Westinghouse Chain Grate, as best meeting your specific requirements.

Westinghouse Electric & Mfg. Co.  
East Pittsburgh, Pa.

**W**

WESTINGHOUSE  
ELECTRIC

# Westinghouse





## What the Safety Car is Doing at Seattle, Wash.

*Population served 400,000*

**W**ILL you still believe that the Safety Car is just a village proposition when you read that Safety Cars in Seattle are run with four-motor, two-men cars on a combined headway of 40 seconds?

And that on the Summit Avenue Line itself these Safety Cars frequently are run on headways of 4 minutes?

As to traffic building: What do you think about increasing travel by one-half while reducing the operating costs by one-third at the same time?

*Why wait when such results are possible?*

### SAFETY CAR DEVICES CO.

Main Office—Boatmen's Bank Bldg., ST. LOUIS, MO.

CHICAGO  
Railway Exchange Building

NEW YORK  
City Invest. Building

PITTSBURGH  
Westinghouse Building

CANADA—Canadian Westinghouse Co., Ltd., Hamilton, Ont.





# PRODUCTS

*Quality First*

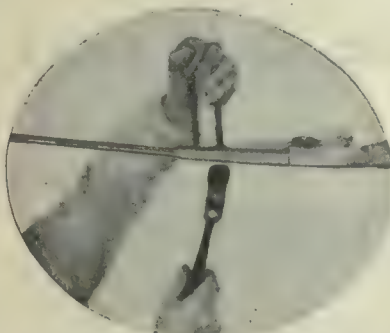
## Installing O-B Cam Taps



Slip tip under hooks—



Turn over and down on the wire—



Clinch the lips and the job is done



## O-B Type ER 90° Live Trolley Crossover

Also made in 8°, 15°, 23°, 33°, 35° and 37° Angles

The O-B line includes Live Rigid, Live Adjustable and Insulated Adjustable Crossovers.

## Cut Installation Time 50% At First Trial

One recent winter night a large city property took its first lot of O-B Crossovers out on the tower wagon. The foreman turned one over to a lineman who had never handled a Cam Tip before.

He looked it over and started to work. It took him just half the time, by the clock, to put that O-B Crossover on the wire as it regularly took him to install a bolted tip crossover. And he had been working with bolted tips every day.

Linemen who are used to cam tips cut the installation time to about one-third instead of one-half. But rapid installation is not the only valuable feature of O-B Crossovers.

For instance, those same cam tips that slip in place so easily, provide such a good wire-to-pan passage for the wheel that arcing and pounding are practically eliminated. Long life of Crossover and adjacent trolley wire follows.

Send for "Saving Time on the Line."

## THE OHIO BRASS COMPANY, Mansfield, Ohio

New York

Philadelphia

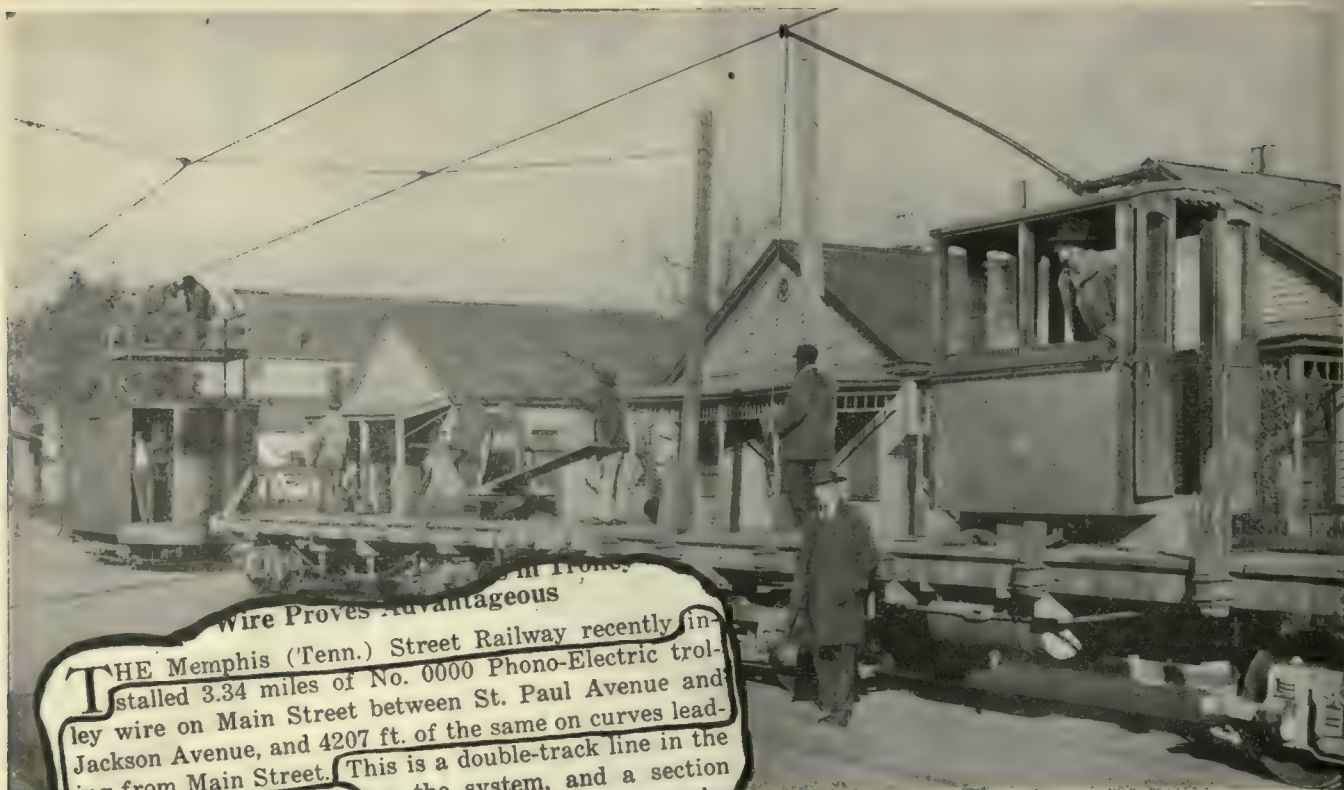
Pittsburgh

Chicago

Los Angeles

San Francisco





**Wire Proves Advantageous**

THE Memphis (Tenn.) Street Railway recently installed 3.34 miles of No. 0000 Phono-Electric trolley wire on Main Street between St. Paul Avenue and Jackson Avenue, and 4207 ft. of the same on curves leading from Main Street. This is a double-track line in the most congested district on the system, and a section over which all cars pass. The supporting steel poles

# Phono-Electric

—in the Congested District and on the Curves—Because it Wears

It gives consistently faithful service and can be relied upon to stand the strain where traffic is heaviest.

Where trolley wire is subjected to eccentric wear or where permanently good alignment is necessary—curves for instance—that's where you need Phono-Electric Trolley Wire most.

Follow the example of the Memphis (Tenn.) Street Railway. Reduce maintenance costs NOW.

**Bridgeport Brass Company**  
**Bridgeport** **Connecticut**





The Cleveland Railway Company  
has rebuilt many miles of track, using

## INTERNATIONAL STEEL TWIN TIES

These ties were used in *reconstruction work*, similar to that on Euclid Avenue, shown in the illustration, which was done in 1918.

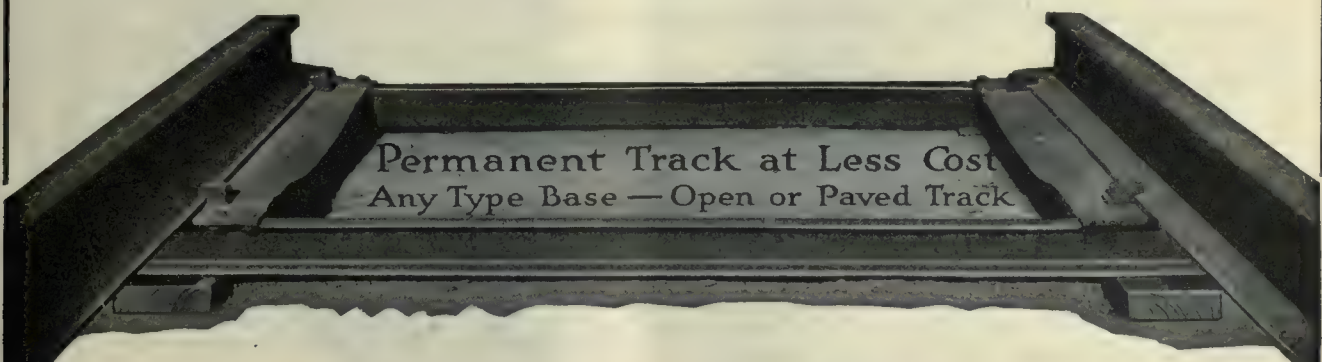
The Cleveland Railway is only one of the many important railways now using these ties in a big way. But the *economies* that result from their use are fully realized whether they are used on *small lines* or on big ones; whether for *new track* or for reconstruction.

These economies are *fixed*. They are economies of labor, material, excavation and repair.

One instance will explain them. With these Steel Twin Ties you can get a perfect concrete foundation *with as little as 7-in. of concrete*—because the 3-in. steel channels that tie the plates together reinforce the concrete. And this is only *one* reason.

International Steel Twin Ties have proved their worth and demonstrated that they are a very profitable investment.

Let us figure on your 1919 requirements.



Permanent Track at Less Cost  
Any Type Base — Open or Paved Track

## The International Steel Tie Company

Manufacturers of Steel Twin Ties and Crossing Foundations

General Sales Office and Works: Cleveland, Ohio



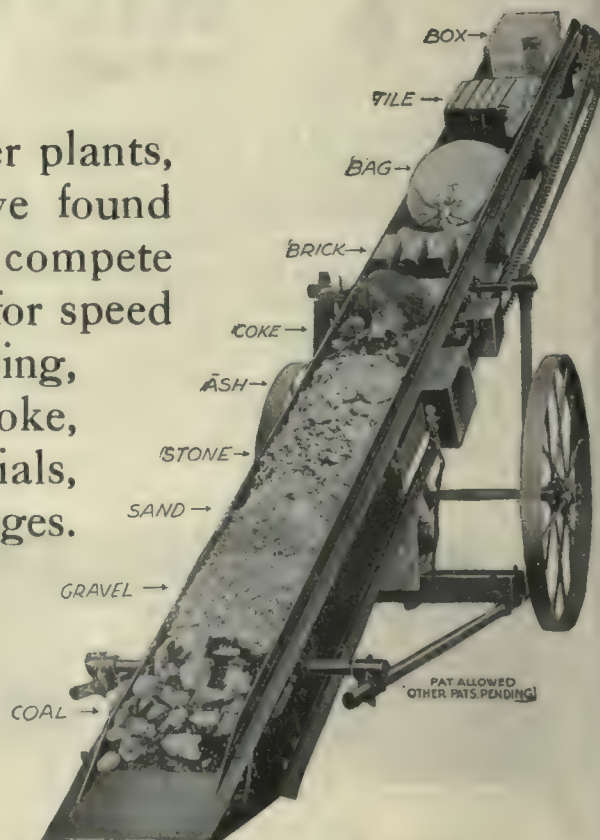
# The SCOOP CONVEYOR



Over 1000 leading factories, power plants, contractors and coal dealers have found that no other equipment can compete with the SCOOP CONVEYOR for speed and economy in loading, unloading, storing and reclaiming coal, coke, gravel, sand and similar materials, bags, boxes, crates and bulky packages.

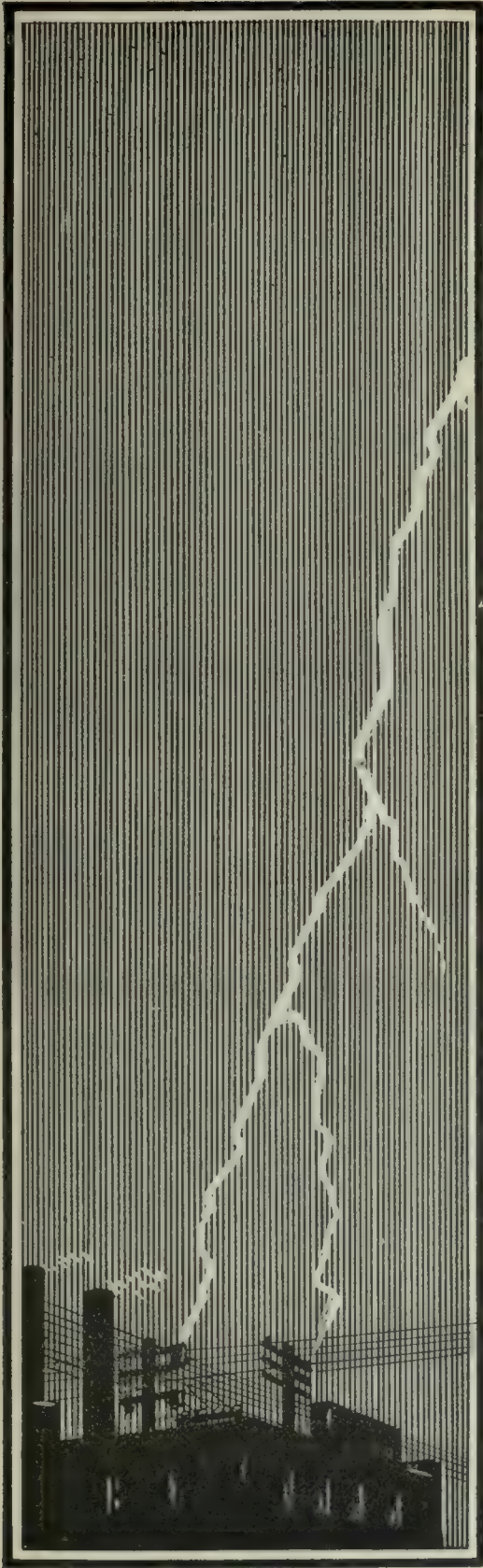
It takes the place of six to twelve men and reduces the "idle time" of other equipment. Power driven and portable.

Write for Illustrated Literature.



## Portable Machinery Co., Inc., Passaic, N. J.





## *Do You Know that Lightning Flashes May Cost You Thousands of Dollars?*

Do you know that the Garton-Daniels is the one type of lightning arrester that has remained unchanged in principle through more than a quarter century of service?

## **Garton-Daniels Lightning Arresters**

That their small air-gap distance, low series resistance and positive mechanical circuit breaker form a combination which is perhaps the most efficient and reliable lightning protective unit known?

That right now, before lightning flashes actually interrupt your service and probably burn out some apparatus, it is indeed the time to consider lightning protection and buy sufficient Garton-Daniels Lightning Arresters to protect all of your important apparatus? Sold by Dealers generally the world over.

# **ELECTRIC SERVICE SUPPLIES CO.**

*Manufacturer of Railway Material and Electrical Supplies*

**PHILADELPHIA**      **PITTSBURGH**      **NEW YORK**      **CHICAGO**  
17th and Cambria Streets   335 Oliver Building   50 Church Street   Monadnock Building



Railway Track-Work Co.

30th and Walnut St.

Philadelphia, U.S.A.

**Fabrica de GAZ**

Fogões economicos por aluguel.  
Aquecedores para banheiros. 1-1:  
Lustres de gaz e luz electrica em  
combinção e ferros a gaz para  
engommar.

**Abastecimento de AGUA**

Tudo para agua quente, com  
materiais que impedem  
aquecedores  
fritos.



**LABORATORIA**  
Produção de asfalto, plan  
refinado, carbolino e oleos espe-  
ciaes para a Fabricação de desin-  
fectantes.

**FORNECIMENTOS**

De aterro, pedra britada e saibro  
branco. Calçamentos a paraleli-  
pipedos e factura de passeios.

**FUNDIÇÃO**

De ferro, metal e aluminium

Gentlemen:

I should be obliged if you would forward me particulars of your Reciprocating Track Grinder, as we are thinking of purchasing a machine of this nature. Our present grinder is one of the type manufactured by \_\_\_\_\_ but as it is not a reciprocating one, its field of usefulness is limited.

Our system is 550 Volt. D.C. and our gauge 135 centimeters.

Yours very truly,

General Manager.

JHE.

# The Voice of Experience

If the experience of this South American company in connection with track grinders stood by itself alone it would hardly be conclusive enough to be of importance. But it is precisely the same as that of scores of electric railways in the United States who have found that the

## Reciprocating Track Grinder

is the only machine that answers the demands of every condition and does the work cheaply, efficiently and thoroughly.

You can prove this fact to your satisfaction on your own tracks at our risk.

**RAILWAY TRACK-WORK COMPANY**  
30th and Walnut Streets, Philadelphia





Armco Iron Culvert installed under a heavy fill on a Western Railway

## Don't be afraid of overloading them

Prof. A. N. Talbot, of the Material Testing Laboratory of the University of Illinois, applied a weight of eleven tons to the lineal foot to a 36-inch ARMCO IRON CULVERT and found that "The pipe was still in good condition and there was no break in the metal."

Geo. L. Fowler, consulting mechanical engineer, after a series of tests on ARMCO IRON CULVERTS of various diameters reported: "With a covering of earth equal to their own diameter they are uncrushable."

The picture shown above proves that in *actual service*

### "ARMCO" IRON CULVERTS

measure up to the results obtained in laboratory tests.

The one culvert you can *always* rely on to give *permanent satisfaction* in any kind of soil, under any service condition, is ARMCO. It is no longer necessary to

predict long life for these culverts—countless installations in all parts of the country enable us to *prove* it. May we submit the evidence to *you*?

There is a manufacturer in nearly every State, and in Canada, making genuine rust-resisting ARMCO IRON CULVERTS and other products of ARMCO IRON, such as flumes, siphons, tanks, road signs, roofing, etc. Write for full information and nearest shipping point on products in which you are interested.



**Armco Iron Culvert & Flume  
Mfgs. Association**  
Transportation Building, Chicago





*Tell your Sales Story*

to the electric railway  
industry in the

*Annual Maintenance Number*

Electric Railway Journal •

*March 22*

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**Wire Now**

what space to reserve  
and send copy and cuts  
by special delivery mail.

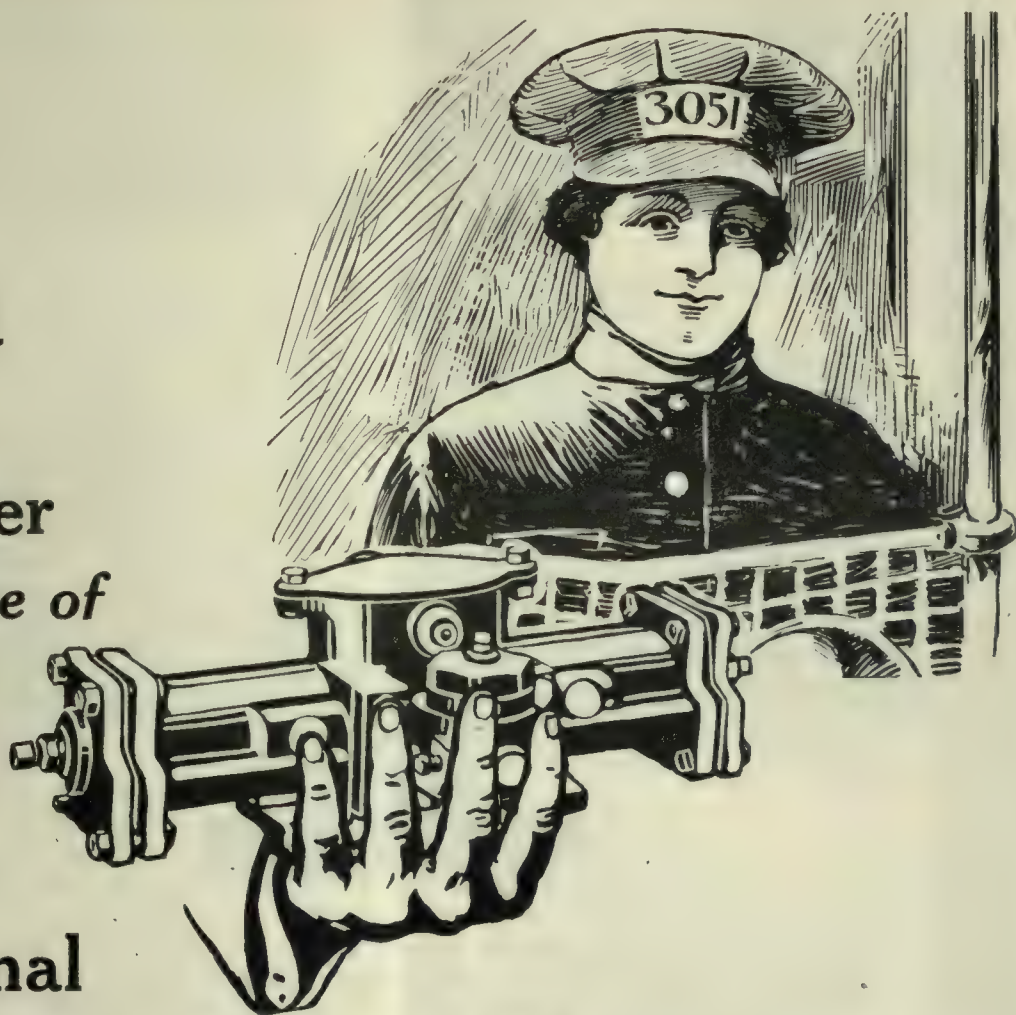
*Electric Railway Journal*

Member Audit Bureau of Circulations

*Tenth Avenue at 36th Street, New York*



Just a  
Car  
Cashier  
because of



## National Pneumatic Door and Step Control

All reasonable objections to women conductors are removed when you equip your cars with National Pneumatic Door and Step Control.

For all that is then necessary to open and close the doors quickly, positively and safely is to push a button, turn a lever or press a pedal as you desire.

The National Pneumatic engines do all the *work*; the conductress does all the *thinking*. Her job is simply that of a car cashier at better than mercantile wages.

Here is the way to settle the problem of putting the *selling* idea on street cars!

# NATIONAL PNEUMATIC COMPANY

INC.

50 Church St. New York



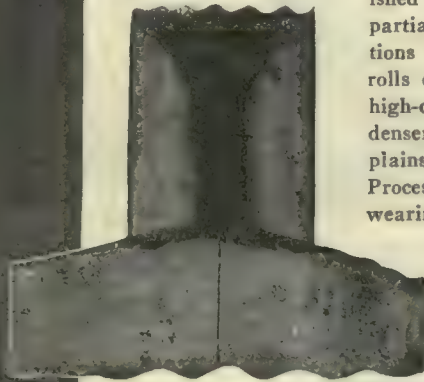
515 Laflin St. Chicago



## How the Lackawanna Deseaming Process eliminates two very serious rail faults

### Greater Safety

through removal of all seamy metal from the vital part of the base



Typical base seam—the kind that tends to open up and cause fracture.

The weak, partially decarburized surface steel of the original ingot is ordinarily finished into the rail, but if hot-milled off the partially formed rail section, at the locations of rail head and base, the finishing rolls complete their work upon clean, solid high-carbon steel and produce a harder, denser and finer finish. This, in short, explains how the Lackawanna Deseaming Process eliminates seamy bases and soft wearing surface.



### Better Service

through a harder top surface that is not so apt to wear down or slough off



Rail head sloughed off under the cold-rolling action of the wheels.

**T**REATMENT of the partially finished rail bar as described above is the only recent *real* improvement in rail manufacture—and is the logical way of meeting present-day increases in wheel load. This is proven by the marked resistance to wear and freedom from fracture, which Lackawanna Deseamed Rails have demonstrated in several years of service.

Etching away the head and base surfaces of rails made by this process shows an entire freedom from seamy, streaky metal at these locations, and hardness tests also prove that the metal here is slightly superior to that in the body of the rail.

This deseaming process, as originated and controlled exclusively by us, is now applied (see picture below) to all Lackawanna Sections of 50 pounds per yard and over.

Those seeking safer track, greater load capacity and reduced maintenance expense can profitably study our illustrated book on The Lackawanna Deseaming Process, which we will mail on request.

Ask for our booklet "Improved Track Appliances."

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## Lackawanna Steel Company

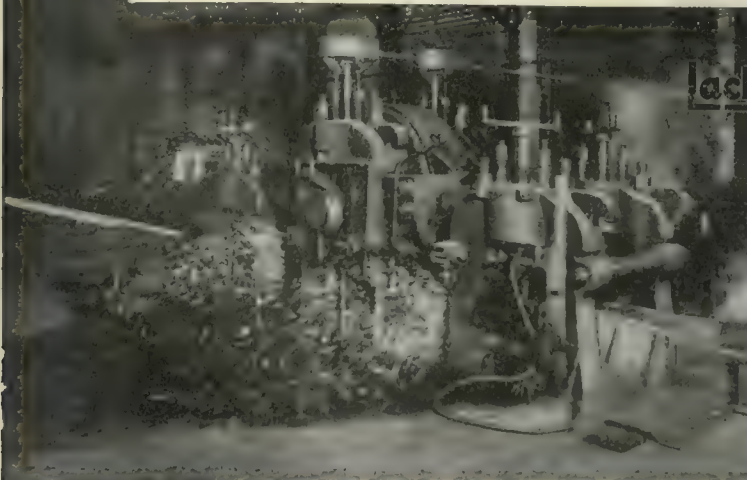
LACKAWANNA, N. Y.

ATLANTA  
BOSTON  
BUFFALO

CHICAGO  
CINCINNATI  
CLEVELAND

DETROIT  
NEW YORK  
PHILADELPHIA

ST. LOUIS  
SAN FRANCISCO  
HAVANA







## In Spite of Its Looks—

This picture of one of the principal streets in a leading Western American city is not so 'ancient' as it might be thought.

This view of Washington Street, Indianapolis, was made in 1872. That is only 47 years ago and there is many an active resident of Indianapolis in whose memory this scene with its ox-drawn springless wagons is fresh and vivid.

It is the greater part of the marvel of growth in transport methods in America—that improvement has been so extremely rapid.

That the stage coach should have yielded to the horse car on rails—the horse car to the cable—the cable to the trolley—is not at all strange. But that all of these successive steps should have been brought about in less than half a century is a monument to the men who have made such achievements possible in so short a period of time.

This quick moving progress could not have been possible except as every department of the industry kept pace with it. In that respect certainly

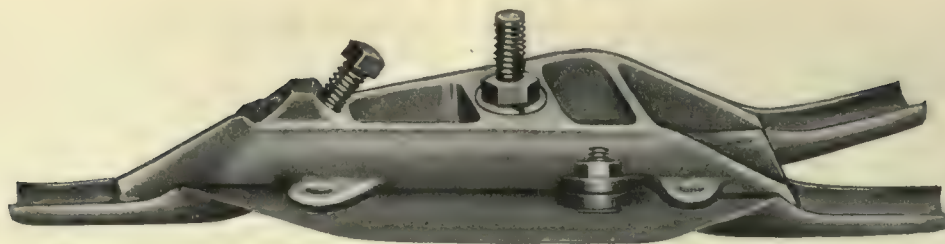
## Galena Oils and Galena Service

have carried their full share of the load. Generally speaking, we think it is fair to assume that they have been not laggards but leaders. Which accounts, of course, for their preeminence of use in the field of transportation lubrication.

# Galena-Signal Oil Co.

## Franklin, Pa.





**G-E Renewable-Pan  
Trolley Frogs**

During morning and evening rush hours 290 cars per hour pass around the Market Street loop in San Francisco—the busiest traffic point on the coast. A few minutes delay creates a serious tie up reaching for many blocks and affecting thousands of people.

**G-E Form N Renewable-Pan Trolley Frogs**, with their record of a new pan installed in 40 seconds, are used on this loop. Where seconds count, the time and labor saving features of this frog are fully appreciated. Two bolts fasten the pan in place—no tampering with the wires.



**General**  **Electric**  
General Office **Company** Schenectady, N.Y.



# Electric Railway Journal

Consolidation of STREET RAILWAY JOURNAL and ELECTRIC RAILWAY REVIEW

Volume 53

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Number 11

## Getting the Electric Railway Industry Back Upon Its Feet

THE American Electric Railway Association held in New York yesterday what in many respect was the most successful mid-year meeting in the series of nine. The circumstances surrounding the electric railway industry are such that topics not vital to the continuation of this essential public industry must be put aside for the time, and this was characteristic of the meeting program. The report of the committee on readjustment showed a determination to get down to fundamentals and, while confessedly preliminary, indicates the lines upon which readjustment must be brought about. On behalf of the industry the committee realizes that some relation between income and cost of service must be recognized by the public and its report furnished a fitting prolog to the discussion on the salient features of service at cost franchises, and on modern regulatory plans and theories. It was an excellent idea, also, to have placed before railway operators the points of view of the investors and the regulators, as was done at the afternoon session. A glance in the mirror now and then is beneficial and under present conditions will not conduce to vanity.

The banquet was a "wonder," in point of attendance and spirit. Our distinguished guests of honor must have received the impression that while the meeting was one of great seriousness the occasion was far from being a funereal one.

If it had not been for the war this meeting would have been the tenth in the series. The plan of holding a winter meeting has therefore been under trial long enough to prove its worth or otherwise. It has been a great success and performs a function complementary to that of the annual convention. This year's meeting was the best of all and, coming after the war, it permitted the thought and feeling pent up for two years to find vent.

## A Banker Gives His Views On the Electric Railway Situation

IT IS WELL that the association asked Mr. Sisson yesterday to present the views of the bankers on the present situation. Being so close to their work, electric railway men are exposed to the danger of anyone in that condition of failing sometimes to get the proper perspective of a given situation. Mr. Sisson, however, took the same view of the desperate condition of the utilities without remedial legislation which the executive officers of these companies have been forced to adopt. In addition, he traced the responsibility for the greater part of this trouble to a deplorable indifference on the part of the public and governing authorities, who in their disregard of the rights of the utilities are

jeopardizing the credit of many investment institutions, such as savings banks and life insurance companies.

Mr. Sisson also brought out clearly the evil reflex effect of this persecution on those responsible for it. In attacking the utilities unjustly the public is not only injuring the interests of their own community whose prosperity depends upon an efficient and prosperous electric railway system, but they are depreciating the value of the assets of the organizations for popular saving. The municipal authorities who deny fair treatment to the utilities within their jurisdictions discredit their own municipalities in the eyes of bankers and investors, who are quick to discern which cities have a reputation for treating invested capital within their boundaries fairly and which have not. Finally, the state and federal authorities who are ever ready to pile burdens on these public servants but are slow in lending them a helping hand will find that they are encouraging a popular antagonism to private enterprise, and investments of all kinds, and are encouraging the establishment of a state socialism with its extinguishment of all individual incentive and effort.

It is fortunate that these facts should have been stated so clearly, and that they should have been said by one who is in so good a position to read the signs of the times as Mr. Sisson.

## Conflicting Dates of Two Important Railway Meetings

IT WAS UNFORTUNATE that the American Institute of Electrical Engineers' meeting in Boston, at which Calvert Townley's paper on "Some Possibilities of the Steam Railroad as Affecting Future Policies" was presented, and the mid-year meeting of the American Electric Railway Association in New York, were scheduled for the same date this week. To be sure, Mr. Townley's paper was assigned to the morning program, permitting attendance at Boston in the morning and New York in the evening, but this was only a partial solution of the difficulty. The occurrence suggests that secretaries of societies might co-operate in avoiding conflicts of meetings when any considerable number of men might desire to attend more than one. A few years ago there was an association of technical association secretaries for this very purpose, but apparently it is not functioning at present. We realize, of course, that circumstances beyond control frequently dictate the times and places of meetings. This was undoubtedly true, at least in part, in the present case, for each association was familiar with the plans of the other. Nevertheless the subject is worthy of attention, particularly in connection with the summer and fall convention plans which will be laid in the near future.



### The October Convention Would Be Incomplete Without Exhibits

**T**HERE are many reasons in favor of resuming the exhibit feature at the annual convention of the American Electric Railway Association next October and few reasons against it. For three years there has been no exhibit and consequently no opportunity for a great many electric railway men to study at first hand what the manufacturers have been doing recently in the way of producing improved equipment. Yet, during these three years, in spite of the war, there have been tremendous advances in the manufacture of railway apparatus. Indeed, the extraordinary and arduous conditions which have prevailed in the electric railway field have greatly stimulated the design and manufacture of much of this equipment. For examples, we might cite the one-man car, energy-checking and saving devices and various processes of welding. All of these have become more important than ever before in the electric railway field as the result of the critical condition in which the electric railways have been since 1916.

It may be argued that the electric railway companies are not in affluent circumstances and so are not in a position to extend their purchases greatly. Unfortunately, this is true. But the equipment which would naturally predominate among the exhibits at the fall convention would be designed either to save money or to make money. Some of the devices and apparatus belonging to the former class have already been mentioned. As an example of the latter we might mention collecting and registering apparatus especially designed to take care of the odd and varying fares now so common on railway properties. These, with the equipment and supplies which railways have to purchase to keep their lines in operation will naturally form the basis of any exhibit which may be held next October.

The advantage of an exhibit does not lie entirely in the fact that the railway manager and engineer has an opportunity of seeing in operation a new device or improvement designed for use on his property. He can talk about it at the same time with the manufacturer and other railway men and can ask any questions about it which he desires. The educational value of the exhibits is unquestioned, especially after there have been none for three years, and, indirectly, they increase electric railway traffic by making the service more desirable or by decreasing its cost.

To be sure, an exhibit requires an investment of money, energy, thought and time. Some manufacturers and possibly some railway men may question the wisdom of this expenditure at a time when business conditions are as unsettled as they must be for both at the close of the world cataclysm. This legitimate doubt should receive due weight, but we believe that if a general vote of the members could be taken, the verdict would be: "the ayes have it."

The action of the executive committee on March 13 indicates that unless unforeseen difficulties are encountered in the preparation for the convention the exhibits will be a feature of the fall meeting. The convention committee, soon to be appointed, will be charged with the duty of making provision for them. We bespeak for the committee the hearty co-operation of all manufacturers, to the end that the exhibits this year shall be unprecedentedly successful both individually and collectively.

### An Obvious Duty of the New York Legislature

**W**E WONDER if the people of New York, through their representatives in the State Legislature, will be sufficiently fair minded to correct a defect in the public service commission law which has been found to work an injustice toward the utilities of that State. The incompleteness of this law is called to the attention of the Legislature in the annual report of the First District commission, recently made public. It is a plain plea for justice, and we hope the lawmakers of the Empire State will rise to the occasion and approve the amendment which will put the commission in a position to save scores of essential utilities from financial disaster.

As pointed out in this report, it was undoubtedly the intention of the Legislature to provide in the public service commission law for tribunals not only to take care of the complaints of consumers and patrons, "but, recognizing that the public service corporations have legal and business rights, to afford them also a tribunal which should impartially inquire and if necessary give relief by way of increased rates." Reference is made to the fact that in isolated cases certain cities and villages have waived franchise conditions so that a fair settlement might be made with the utilities. These acts are mentioned, however, as "but temporary and makeshift devices," and it is suggested that the commission, or the municipalities or the corporations should not be left to such expedients.

Ever since the decision of the Court of Appeals in the Rochester case was announced the commission has found its hands tied. Its members recognize the inequity of the situation, and it should not be too much to expect that the present Legislature will take prompt steps to correct the law so that it will be possible to deal equal justice to the utilities and to the consumer.

### The Detroit City Government Wants to Run the Railway

**T**HE latest report from Detroit is that the city and the company are approaching a settlement on the question of the purchase of the city lines of the Detroit United Railway. This is certainly a wiser plan than the first suggestion that the city build a competitive system. Municipal ownership and operation of the present Detroit city system is a perilous experiment for the taxpayer in Detroit, but the expenditure of a large sum of money to go into competition with the private company would be insufferably stupid. San Francisco stands as a living example that this is so.

Seattle started a similar program on a small scale, but the city and the railway decided that such a course was suicide. At Seattle it was a case of getting together or hanging separately. The start was made toward getting together, and this was finally effected as in Detroit. The recent decision of the Supreme Court, as reported in our issue of Jan. 18, undoubtedly hastened the latter city in deciding because it declared that the city could not compel the company to give service on the lines on which the franchises had expired except at a rate which would earn a fair return on the investment.

If the decision of the city government to engage in railway operation is ratified by the electorate, as it must be to become legal, Detroit will be the third large city in this country to adopt municipal ownership and



operation. There will therefore be an opportunity of judging, after a few years, whether a municipality can operate an electric railway property as successfully, all things considered, as a private corporation. For all, except possibly the taxpayers in the cities conducting the experiment, the trial will certainly be an interesting one.

### The Electric Railway Industry Is "Coming Back"

IN EXPRESSING his pleasure at the success of the recent Cleveland meeting of the Central Electric Railway Association, Charles L. Henry characterized the situation in the happy phrase: "The Central Association is 'coming back.'" We agree with Mr. Henry in this conclusion and will go him one better by saying that the industry as a whole is "coming back," or we mistake greatly the signs that are about. The mere statement is not sufficient in itself, however, and it raises in the mind several questions which are well worth consideration at the dawn of the era of reconstruction and readjustment. They are especially apt as yesterday's meeting of the American Association is reviewed. The questions worth pondering at this time are: Why does the industry need to come back? What is it to come back from? What is it to come back to? Each railway man will have his own answers to these questions, colored by his own experience. There are points, however, on which all of the answers will be sure to agree.

The industry needs to come back in order that the communities which it serves may have good transportation of the types which the electric railways are best fitted to give. A unique combination of circumstances has made it physically impossible of late for the average electric railway to give good service and pay all legitimate expenses. War burdens were superimposed upon others almost unbearable and many fine properties have temporarily broken down under the strain.

The industry needs to come back from the depression under which it has been laboring. The past few years have been a nightmare to owners and operators, as they have tried to meet the demands for better service, better wages and higher prices for money and supplies. These things have increased faster than the ability to meet them, that's all. At last it became imperative to ask the public to overlook franchise stipulations, tradition and general affection for the nickel as a fare unit, and reluctantly the public has done so, at least to a partial extent.

The new status of the industry toward which we are now being impelled forcibly by circumstances will be radically different from that of five years ago. In fact, the difference will be startling when, for example, 1925 and 1915 are compared. Prophecies, particularly in print, are dangerous, but some things are plain. Net income will be surer because the public will take more direct financial responsibility in the business. Service will be better because the needs of the traveling public will be better understood and the general public will be willing to supplement the railway income if necessary to insure first-class service. There will be no speculative profits but capital legitimately invested will be amply secured. The public will have a larger part in the management of properties and there will be

far less delay in adjusting income to expenses. Above all, let us hope, the people in 1925 will be as strong boosters of their car service, and with reason, as they were vigorous knockers in 1915.

### Public Service Proposes Zone System With Stand-By and Mileage Charges

THE zone system proposed by the Public Service Railway is an important step toward the more general adoption of a logical fare for local transportation. By basing the charge for the service upon its cost, accuracy is substituted for guess and a scientifically determined and flexible fare takes the place of one which any change in conditions is likely to make unfair for either the company or the public—and the companies have learned by sad experience that it takes much longer to raise a fare which is too low than to lower one which is too high.

The lighting and power companies for many years have known that their expense of supplying energy can be separated into two factors: the stand-by charge, or that representing the readiness to serve, and the actual operating expense of generating the kilowatt-hours consumed. Water companies have also adopted this method of charge, in a number of instances. The expense of providing transportation is capable of a similar division, but up to this time no one has attempted to allocate fares on that basis. Where fares are based strictly on the distance travelled, as has been the case in the past on the steam railroads in many states except for the additional few cents required to make an even nickel, we have an effort to cover both items of expense by a charge covering only one of them. Where the other horn of the dilemma has been chosen, as by the electric railway companies in establishing a uniform fare which would answer for all distances within a city, we have an example of the extreme which has been reached in the other direction.

Either of these systems can be made to answer for a time and so long as the surrounding conditions are favorable, but both develop weaknesses as soon as the circumstances become less propitious. The uniform fare regardless of the distance is particularly vulnerable with rising prices of operation, because if the system is at all large the charge for transportation has to be made so high as inevitably to drive away the short-haul traffic.

These considerations have led to the various attempts by electric railways in this country, which have been more or less successful, to combine the two plans under the two-zone systems. This is undoubtedly a move in the right direction, but it still runs the danger of discouraging traffic in either the central or outlying zones. The chief impediment in the past to a more exact system has been the seeming difficulty of collecting and accounting for fares, but this the management of the Public Service Railway believes it has overcome. The plan of entrance checks with pay-leave is a bold solution of the problem on such a large system as that in New Jersey, but a trial of the system is certainly worth making. We hope that the Board of Public Utility Commissioners will grant the application, because, while the plan is avowedly designed primarily for the needs of the Public Service system, its success there will be of great technical value to other properties which are struggling with the fare question.



# A Square Deal Is Needed\*

*All the Railways Want Is That They Be Valued at Cost of Establishment and That They Receive an Inviting Return to Compensate Capital for Risks Assumed and Service Performed*

By A. MERRITT TAYLOR

President Philadelphia & West Chester Traction Company, Philadelphia, Pa.



**B**EFORE the war, in many localities, the public attitude toward public utility companies had become distinctly antagonistic. This antagonism was brought about in part by certain companies which had pursued practices inimical to the public welfare. It enabled designing politicians and public officials to serve their selfish purposes by making reprisals against the electric railway industry.

Such practices have now been outlawed, and the public has been safeguarded against their recurrence by effective legislation. Consequently a reconstruction of public sentiment respecting corporate enterprises is now distinctly in order and is actually taking place.

## SAFEGUARDING BOTH UTILITIES AND THE PUBLIC

Owners and managers of electric railways must accept this favorable opportunity and co-operate in developing and establishing certain specific, vital, fundamental and just principles which will safeguard and advance the interests of the public and of the public utility companies. The most important of these principles are:

1. Electric railways are entitled to franchises which will assure the owners against loss of capital or income resultant from franchise renewals being denied them, or from unreasonable and confiscatory burdens being forced upon them.

2. Electric railways are entitled to have equitable valuations made of their properties as a basis for financing and rate-making.

3. Electric railways are entitled to charge rates which will adequately compensate the owners for the capital invested, for the risks assumed and for the service performed.

Corporations which have engaged in enterprises unjustifiable from an economic viewpoint, or which through gross over-capitalization are unable to accept and adopt the foregoing principles and to serve the public properly, constitute an abnormal class which the American Electric Railway Association cannot justly sustain.

The legislatures, public service commissions and municipal governments are mainly composed of lawyers and laymen who have had little, if any, experience in the financing, construction and establishment of electric railways as going concerns. Consequently many of them have slight conception of the elements of cost which must be included in arriving at a fair valuation of an

established electric railway property as a basis for financing or rate-making; or of what constitutes an equitable and necessary return adequately to compensate the owners for the use of the capital invested, for the risks assumed and the service performed in the public interest; or what franchise provisions are essential to safeguard the public and corporate interests from the broadest viewpoint.

It is, therefore, the duty of railway executives, as operators and as citizens, to lay before these public officials the facts developed during many years of practical experience, with substantiating evidence, which will aid them in arriving at just decisions and in dispensing exact justice to all parties.

## FRANCHISES CAN BE STANDARDIZED

A franchise, as it stands to-day, certainly has no other function or virtue than that of an instrument under which private capital performs a public service, and the idea of any inherent value attaching to it has long ago evaporated in the mind of everyone who knows anything about the subject. Blundering attempts to insure good service and to restrict profits have resulted in tying up most electric railways in unfair, inelastic, impracticable and dangerous covenants which have actually prevented uniform good service, encouraged discriminatory charges and brought capital to the brink of disaster.

In the interest of both parties, therefore, electric railway franchises must be revised along reasonable and scientific lines so that they will produce the result for which they exist. They must assure the owners of the right to possess and operate their properties at least until they are fully reimbursed for the value together with an equitable return.

Electric railway properties should not be subjected to special taxes or other burdens in the nature of taxes, such as street paving, to an extent in excess of the levies laid on other lines of capital and industry. All provisions with regard to service and limitations as to rates of fare can be best left to public service commissions for determination when action becomes necessary under unforeseen and varying conditions which are bound to develop.

The electric railway franchise is susceptible of scientific standardization which will assure the public and the corporate enterprise of a "square deal." It is the duty of the association to develop promptly a standard form of franchise which will by its terms conserve the best interests of both parties.

## WHAT IS A FAIR VALUATION?

More than twenty years of experience in financing, constructing, reorganizing and operating public utility properties, and years of experience gained from the public viewpoint as Transit Commissioner and Director

\*Abstract of address presented before mid-year meeting of American Electric Railway Association in New York, March 14, 1919.



of the Department of City Transit of Philadelphia, and as Manager of the Division of Passenger Transportation and Housing of the United States Shipping Board, Emergency Fleet Corporation, have led me to conclude that there is slight, if any, real ground for a difference of opinion between corporations officered by practical and honest men and honest and practical public officials as to what constitutes a just formula for the valuation of electric railway properties which have been constructed where the present and prospective population and traffic justify their existence.

A just valuation of a legitimate electric railway property must include:

Just compensation for services performed in developing, establishing and financing the project.

The amount of all legitimate costs and expenses incurred in the incorporation of the company and in securing its franchises and rights-of-way, and the cost of maintaining its organization and of engineering during the development period.

The cost of securing the capital required for the development of the enterprise.

The cost of constructing and of equipping its property.

The cost of construction required by the terms of franchises and ordinances, such as street paving, etc.

All operating deficits and depreciation which accrue when these items cannot be met out of income.

All obsolescence charges which cannot be met out of net income without depriving invested capital of its just return.

A just and profitable return on capital invested, which of necessity must accumulate as a capital charge up to the time when such a return can be currently paid out of net income.

On their part, the electric railways must either accept this formula or its equivalent for the valuation of their properties or be open to the charge of unfairness. And the public likewise must be brought to recognize that such companies as agree to accept and abide by such a valuation are standing on an honorable basis which justifies and is entitled to public support.

#### RATES MUST YIELD INVITING RETURN

The elements of the true value of an electric railway property having been thus defined, the question arises as to what rate of return the owners are entitled to receive.

The development of every electric railway property is accompanied by material risk to the capital invested therein which entitles the owners to special compensation. In rare cases where capital invested in such an enterprise is represented solely by stock, each investor assumes the same and equal risk in proportion to the amount of his subscription, and is entitled to his proportionate share of the profits.

Usually, a large portion of the capital is borrowed on bonds or other obligations yielding a fixed rate of return which is assured by the stockholders who supply and place at risk the remaining capital required. Under these conditions, the capital borrowed assumes little, if any, risk, and practically the entire risk of the enterprise is focused upon the investment of the stockholder, who is entitled to be compensated accordingly.

Those not familiar with the practical side of the problem will of course argue that the investor takes no risk if the company be assured the right to charge such

rates of fare as will yield an adequate return on the value of the property. Recent experience has demonstrated the fallacy of this argument, because in the case of many electric railways in this country the travel so declines with increases in fare that an adequate return on the investment cannot be earned at any rate of fare.

The expectation of profits commensurate with the risks assumed is the force which impels courageous pioneers and investors to pool their interests and to engage in constructive public service enterprises. If such a return is to be denied, they will certainly seek other fields which yield adequate profit with ample security.

The investor knows that he can secure a return of from 6 per cent to 8 per cent (varying according to localities) from well-secured first mortgages and upon well seasoned, and in many instances equally safe, standard railroad and industrial stocks which have a wide market and which are readily marketable. He naturally asks why he should invest his money in the development of public service enterprises, the earning capacity of which is yet to be proved but will in any event be limited by a commission to 8 per cent, when he can invest his money and keep it in liquid form without taking any such risks and with the assurance of an equal or greater return at the start, with every prospect in many instances of increasing returns from increasing profits of the business.

Moreover, the man who has the courage, standing and ability which enable him to establish, finance and construct electric railways in anticipation of development and public requirements, and to foster and secure the development of his territory and the resultant earning capacity for his undertaking, is not going to engage in such work unless he is permitted to make a profit (over and above the returns allowed investors) which is adequate to justify his undertaking.

Many electric railway executives and operating men who are not familiar with the circumstances which control the investor in selecting his field for investment, or with the factors which regulate the decision of men and organizations engaged in constructive enterprises in selecting the field for their activities, are prone to regard only the immediate necessities of their companies in discussing what is an adequate rate of return on the capital invested. They must learn to view the subject broadly and have the courage to stand up for their rights rather than for their necessities.

The electric railway which goes before a commission and accepts as satisfactory the fixation of a valuation or a rate of fare which will no more than preserve the life of the property and which will deny to the owners a return that they are justly entitled to receive, is a party to the establishment of a destructive precedent and is a traitor to the industry.

This country is approaching an era of prosperity and vast extension of industry. Money will be in great demand, and those who have money to invest already have the opportunity of investing it in well established, substantial and profitable industrial enterprises and other securities which are now offering high rates of return.

There is some room for difference of opinion as to the rate of return which should be allowed on the value of electric railway properties, and in reaching a conclusion it is necessary to consider the rate of return which can be secured on safe securities issued by other in-



dustries which are immune from the risks which confront the development and operation of the average railway property.

Unless electric railway properties are enabled to charge rates which will yield an inviting return on their cost and adequately compensate capital for the risk assumed and for the service performed, capital is going to be diverted into other channels which are open for profitable investment; and electric railways will be prevented by the action of public officials from establishing and performing such service as the public interest requires.

I have too much confidence in the common sense of the average American to believe that the electric railway industry is going to be denied a "square deal" after the public understands that what the railways want, and all they want and require, is that the properties shall be valued at what it cost to establish them. All they want is the right to charge a rate of fare which will yield a return reasonably compensatory.

#### WHAT THE ASSOCIATION SHOULD DO

I, therefore, make the following constructive suggestion:

The immediate duty of the American Electric Railway

Association is to assemble and print for publication a complete and clear statement which will conclusively demonstrate to the public mind a constructive and mutually beneficial form of franchise, the truth about valuations, and what constitutes a just return.

This information should be placed in the hands of the governors, members of the legislatures, public service commissioners and municipal authorities in all states. It should be furnished to every newspaper. It should be furnished by each electric railway to every one of its passengers and security holders. Moreover, the officers of each member company should be urged to confer with the editors of all local newspapers in the districts which they serve and secure their aggressive co-operation in bringing about a "square deal" between electric railways and the public.

I fully recognize that this is a big, costly and difficult constructive undertaking which will require the best brains and ability in our organization and the thorough co-operation of member companies, but the solvency and life of the industry must be preserved.

We must convince the people that we are prepared to give and receive a "square deal." Then every honest American will become an ally of our industry and our cause will be won.

## Reproduction Cost Is Fair\*

*No Deduction for Depreciation if Property Is in Normal Per Cent Condition, and None Otherwise Unless Utility Is Relieved of Rehabilitation Up to Normal Per Cent Condition*

By H. H. CROWELL

Vice-President Michigan Railway, Grand Rapids, Mich.

THE old order must go. It is evident that new relationships must be established between those who receive electric railway service and those who render it if the various parties are to be satisfied. The parties in interest are the user of the service, the employee in the service, the creditor of the corporation and the owner of the equity. The fundamentals involved are "safe and adequate service" at "just and reasonable rates."

In the formation of new contracts for a continuance of the service, definite agreements should be had in regard to the following points: Fair rate for service; fair return on value of property; maintenance of integrity of capital and recovery of investment upon termination of the contract.

The agreement as to fares, at least in the first instance, will be subject to the right of the State or its duly delegated authority to control public service, but provision must be made for flexibility in order to retain fixed relations under changing conditions.

It has been suggested that an agreement based on service at cost would make for a betterment of conditions and would eliminate opportunity for excess profits to the corporation or excess fares to the public, as well as stabilize the securities of utility corporations and reduce speculation therein to a minimum.

\*Abstract of discussion of report of committee on readjustment at mid-year meeting of American Electric Railway Association, New York, March 14, 1919.

Presuming that the public desires to receive service from a privately owned and operated utility and is willing to pay a fair rate while adequate service is rendered, and that the general plan or agreement under which operations are to be carried on is to be the cost-of-service plan, we must value the property to be used and determine the capital on which a return will be allowed, which capital will from time to time be increased as additions and betterments to property are made. How shall that value be determined, or rather, in the circumstances, what will be fair and equitable to both parties as a base on which to determine the rate of return and the rate of fare that will afford such return?

#### VALUATION OF OLD PROPERTIES RAISES DIFFERENCES

If one were to establish a new utility for public service, it would be comparatively easy to agree upon the value or amount in dollars upon which the owner was entitled to earn a fair return. When a property is well designed and honestly built, the value is at least equal to the cost, including legitimate outgoes required to bring the enterprise to a point where it is ready to operate, or capitalized estimated net earnings at a given rate of interest, the latter being a matter of judgment and opinion.

Unfortunately we have to consider properties which have been in operation for some time, either profitably or unprofitably, and differences of opinion will arise (as in past rate-fixing proceedings) in regard to what



methods of valuation should be used, what should be included, what should be excluded and what really constitutes value.

We are all too familiar with the decisions of courts in favor of present value, and the rulings of many public service commissions, the net result of which is practically to confiscate the difference between reproduction cost new and a value based on the theory that certain physical elements of the plant and property are not new and that a certain portion of their probable useful life is exhausted, irrespective of whether or not capital equivalent in amount has been withdrawn from the enterprise.

#### HOW TO VALUE A PROPERTY

We are not now concerned with the usual rate-fixing proceeding where the regulating authority may exercise its judgment as to the value or rate base. We are considering an equitable agreement for future service.

It would not be excessively difficult to determine the value of a property for purchase or sale. We would undertake to determine the dependable net earnings, and it would be a simple matter to capitalize such earnings at any satisfactory rate of return. This amount, less any cost necessary to restore the physical property to first class working condition, would represent the commercial value. This value would not remain constant but would rise and fall with changing conditions.

Again, we are not presently concerned with net earnings in determining the value for future service, since the earnings are the resultant of a fixed rate made under different conditions.

#### DEDICATION ANEW TO PUBLIC SERVICE

Briefly, the State granted a corporation a charter that it might exist and exercise its corporate functions as defined in its charter during its corporate life.

The State, under its police power, has the supreme right to control public service. It has declared transportation to be affected with the public service and, as such, subject to regulation and control.

When the State offered to the utility the right to function in the public service, it implied that the corporation might function with profit since it has the undoubted need and right to the means of livelihood.

The corporation operated in accordance with its ostensible purpose. Its rate of charge was fixed by franchise or regulated by the State or its duly delegated authority; and, because of the binding force of its contract or of the regulation, it has been obliged to continue service under conditions never contemplated when the contract was made.

The period of sacrifice should end. A fair return should be earned from now on. The property is to be dedicated anew to the public service, and the public accepts anew such dedication rather than furnish its own service. Is there not really a new taking of the property? If so, should not its value be determined by considering the capital that now would be required to create the property and establish it upon its present basis?

#### DEPRECIATION NOT DEDUCTIBLE

The following seems true: No property can be maintained at 100 per cent new condition. Utility properties made up of many elements in various groups, after a period of operation, can be brought to a certain per cent condition, something less than 100, which is the normal per cent condition for that property. The property, in

this normal per cent condition, represents 100 per cent investment; and there having been no actual withdrawal of capital, the value upon which a return should be earned is the full investment value, or 100 per cent. That is, unless the per cent condition is lower than the normal per cent condition for the property, the property should be credited with a value equal to the cost of reproduction at the time of the valuation.

For example, assume that it would cost \$1,000,000 to reproduce a property, that the normal condition is 85 per cent and that the property is in this condition. Then the rate-making base should be 100 per cent of the reproduction cost of the property, it being demonstrated that 15 per cent of the cost of the property has not been withdrawn or returned to the owners.

If the property is in 75 per cent condition, 100 per cent of the reproduction cost of the property should be the rate-making base unless the owner is to be relieved of the liability to rehabilitate to the extent of the 10 per cent deficiency in condition. The public, however, may well require the owner to deposit a sum which, if expended, will bring the property to its normal per cent condition to insure safe and adequate service.

It seems clear that it would be inequitable to require the corporation to furnish safe and adequate service and maintain the property at normal per cent condition under such rate of charge as would permit the corporation to earn only a fair return upon a value or rate base equal to the per cent condition found.

One must bear in mind that, under the cost-of-service plan, the corporation will be required to furnish adequate service, and it must, therefore, first rehabilitate the property and then maintain it at normal per cent condition. A rate base founded on fractional per cent condition cannot be equitable if, ultimately, 100 per cent replacements are made and the whole cost of making such replacements is deducted from revenues before net earnings are found.

We are not attempting to discuss the various methods for determining value that are put forward in rate fixing proceedings, such as reproduction cost new and original cost, or to discuss unit prices or theories of depreciation. Our main purpose is to call attention to the fact that the property is being dedicated anew to the public service, and that the public elects to be served by a privately owned and operated utility in lieu of providing such a property for its own service.

To summarize, therefore, it is believed that in the circumstances, all the obligations the utility will assume being borne in mind, the proper amount upon which the corporation is entitled to earn a fair return is the sum which equals the cost of reproducing the property—such as it is—with no deduction for depreciation if the property is in its normal per cent condition, and with no deduction for depreciation if the property is in less than normal per cent condition unless the corporation is to be relieved of the liability to rehabilitate up to normal per cent condition. Confiscation of a portion of the principal and the right to earn thereon will follow if value is determined differently and a lower rate base is found thereby.

Every effort on our part should be made to bring out the full worth of the property—and by property we mean something in addition to plant and equipment. In making new contracts, both parties thereto and the supervisory commission, if any, should have a true knowledge of the value of the property in order to insure "safe and adequate service" at "just and reasonable rates."



# Rate of Return in Service-at-Cost Franchises\*

*Commissions and Courts Have Not Established the Basis for Fixing the Rate of Return Necessary to Attract Capital; but Position of Company, Basis of Fair Value and Various Safeguards All Influence the Investor's Demand*

By EDWIN GRUHL

Assistant to President, The North American Company, New York, N. Y.



**R**ETURN on investment is the most important indeterminate factor in the service-at-cost franchise. Next to wages, the rental or return on capital is the largest item of cost of electric railway operation. This is because the turnover of the investment is so long postponed that years are necessary before an equivalent in gross earnings is collected. A large packing concern advertises that its

returns are 2 per cent on sales and 11 per cent on capital invested, indicating a turnover of  $5\frac{1}{2}$  times in one year. Compared with this 2 per cent, the turnover in the electric railway business is so small that from 30 per cent to 40 per cent on revenue represents the cost of money with a modest 8 per cent on capital invested. Moreover, the cost of money for future investment is largely beyond the control of either party to the contract. If the return as fixed becomes too low, eventually growth and expansion stop. If it is fixed too high, all advantage to the public of such a contractual arrangement ceases.

One searches in vain among the economic theories of interest, profit and production cost for the fundamental conditions which a service-at-cost contract must anticipate. There are schools of thought that believe that capital and its return are the all in all, and schools, like the socialists, that say it is nothing of the sort. They range in their background from history to psychology and from sociology to finance. They range in their definitions from "pure interest" or cost of money without risk, to "psychic income," that feeling of satisfaction that persists even when money returns are lacking. The electric railway business has no doubt been productive of large income of the latter variety during the last few years, but it is difficult to convey the fact in reports to stockholders or meet the requirements of the bondholders thereby.

## COMMISSIONS AND COURTS HAVE NOT MET THE ISSUE

Nor do we find any fundamentals clearly outlined in decisions of commissions as to rate of return. There are, in rare instances, some discussion on the necessary return or cost of money, some dicta on the risks of the business and some vague references to the equity of encouraging efficient management. Usually no mental

processes are revealed, and the findings of fact as to what is a reasonable rate of return are clothed in judicial patois. The reference to these three factors—return, risk and reward—has suggested a qualified acceptance of the analysis of return in competitive business by the classical economists. In fact, in several decisions, notable among them the State Journal Printing Company case of the Wisconsin Railroad Commission in 1910, the argument is quite fully developed. It is not far afield to examine this analysis, as a mere statement of it discloses the practical difficulties in arriving at what is a reasonable return:

*In theory:* The rate of return on the fair value of the property should conform to that earned in competitive businesses under like conditions. Returns under competition consist of necessary profits and differential or surplus profits. Necessary profits are those which must be earned by the least efficient producer of the same commodity. Should he fail to earn these, he drops by the wayside in the competitive race. Differential or surplus profits are the additional returns earned by the more efficient producers of the same commodity, and they amount to the difference between the cost of production, including necessary profits, and the selling price. Necessary profits, the lowest return which the competitive business must yield if it continues to produce, are defined as being made up of three factors—the cost of money (or interest), indemnity for risks incurred in the business resulting in the possibility of impairment of either interest or principal, and payment for personal skill in the conduct of the business.

*In practice:* The factors are not capable of any exact determination. The mere cost of money, which is only part of necessary profits, is susceptible of proof. But it is difficult to place a valuation upon the inherent risks to which the business is subjected. It is likewise a mere matter of unsupported opinion what measure should be applied to the wages of superintendence or cost of personal exertion and skill in management defined as similar to the wages of labor. Finally, in the determination of differential profits or the addition to necessary profits to care for the inherent economy of one enterprise over the least efficient enterprise which is still able to navigate, one arrives at a factor that no regulating authority has the courage to announce, as is involves the recognition of commendable efficiency. Accordingly, the rule that a regulated monopoly should receive the returns which would exist if a state of competition were imposed upon it, has been supplanted by the rule that returns are properly limited to the amount necessary to attract capital into the business. Differential profits for efficiency have been disregarded.

\*Discussion of report of committee on readjustment at mid-year meeting of American Electric Railway Association in New York, March 14, 1919.



There is, naturally, little in the decisions of the courts reviewing the determinations of the regulating bodies. They have avoided the question as legislative or administrative and have confined their finding, when called upon to do so, to the question as to whether the rate complained of was confiscatory. A return which is less than that necessary to attract new capital into the business may not be confiscatory.

It has been the history of regulation that during periods of high prices and corresponding low returns of public utility service the efforts of regulation have been most pronounced to keep rates down. During periods of general prosperity and low prices, returns which might have been reduced without involving confiscation, have been permitted without the opposition of regulating authorities. It is a curious coincidence that the judicial review has been asserted and denied under the same economic pressure.

In 1878 with prices high and securities at a very low ebb the principle was announced in the *Munn* case that rates fixed by the legislature are not subject to judicial review and that for protection against rates fixed by the legislature resort must be made to the polls and not to the courts. During the period 1888-1896, with gradually bettering conditions, the principle was recognized that where rates give some compensation, however small, the courts will not interfere. Beginning with 1896, with the index number of prices at its lowest ebb, there was a series of decisions, notably in the *New Memphis Gas Company* case, that regulation implies such action as shall be just and reasonable and such as "enables the company to maintain its existence, to preserve the property invested from destruction and to receive on the capital actually invested a remuneration or dividend corresponding in amount to the ruling rate of interest." And in the much quoted case, *Symth vs. Ames*, in 1898, the rule was laid down that "what the company is entitled to ask is a fair return on the value of that which it employs for the public convenience."

Since that date there has been a gradually increasing tendency to concede every presumption in favor of the legislative act. Even at this time, when prices are again high and securities low, three dissenting Justices of the Supreme Court affirm that where franchises expire "the question recurs whether the fixing of any rate by the city could be said to confiscate property on the ground that the return was too low," and suggest that "substantial justice is more likely to result from trusting to the sense of fairness of the community in dealing with such cases than from imposing upon a city a contract which a court shall make for them."

#### IMPORTANT POINTS IN THE CASE

It is elementary that unless an enterprise earns a necessary return consisting of the cost of money, indemnity for risks inherent to the business and a return for management, the business will cease. The fact that the capital cannot be readily removed, and that there are arbitrary restraints such as obligations to continue service, may result for a brief period in such a business being conducted at a loss. Unless, however, the full measure of necessary return is earned, no new capital can be expected to enter the business and any growth of plant such as is vitally necessary in public utility enterprises is stopped.

This is the condition in which electric railways find themselves to-day. Necessary returns are clearly a part

of the cost of operation, although the reaction on the business of failure to recognize such costs is not so immediate as in the case of the cost of materials, labor and taxes. Failure to pay the current price for coal and labor, and meet its tax bills promptly, means prompt insolvency. Failure to meet the necessary cost on capital means impaired credit and diverted capital. Because the turnover is large, the amount of starvation to which the patient can submit before it finally dies is greater than in the case of other businesses. If the traction business were in the same position as the packer, with a 2 per cent. margin on sales, failure to make returns would very quickly shut off production.

Other questions arise when these principles are applied to a service-at-cost franchise. The nature of the franchise, and the valuation basis upon which the rate of return is applied, will influence the necessary return. Whether a different rate of return is to be specified on capital investment existing at the date of the franchise than on future capital additions; whether the return on the capital investment should be based on the entire investment or represent cost on secured liens and a definite return on the stock equity, and whether the return should be fixed or be placed on a profit-sharing basis are also important questions.

#### AGENCY PLAN IS BEST

The most important circumstance is the nature of the franchise. Will the electric railway be the lessee, the partner or the agent of the municipality? The trouble with many existing franchises is that they are leases, with the landlord holding the whip hand, with every element of doubt resolved against the tenant, with no chance to vacate, and with the certainty at termination that a good deal of the property will revert like a fixture which is part of the land. With such hazards surrounding the business and such uncertainty as to integrity of investment, capital must demand a high rate of return.

Under the provisions of a partnership, which shares obligations and profits, the rate of return is stabilized and lowered. Yet no partnership which is based on mutual mistrust can endure, and no partnership franchise has as yet been drawn which so explicitly defined the rights and duties of the parties that they may henceforth dwell in mutual security even though constrained to deal at arm's length. "Reasonably adequate" service, "necessary" extensions, "prudent" management, "allowable" expenses, "good" behavior are familiar phrases which are the seeds of dissension and the temptation of a political issue. Nor does the community of interest yield any restraining influence. The fact that Chicago has a \$20,000,000 and New York a \$100,000,000 stake in the business does not appear to generate any enthusiasm upon the part of municipal officials for very necessary increases in fare in these cities. The city chest or "common good" has no human impulses of self-interest. Partnership arrangements may become, as some of them have, hazards instead of safeguards.

The agency type of franchise appears to have greater advantages. Prior investment is determined and safeguarded; the return on capital additions is fixed at the actual cost of attracting investment; the service, extensions and expenses are determined and approved by the municipality, and the fares are automatically determined to yield the total cost of service. Safeguards of the annual return (such as preference of return on



capital over all other expenditures except labor, guarantee of return through the tax power and maintenance of contingent reserves) and safeguards of the investment (such as refund of the actual investment by the municipality or a successor licensee) eliminate hazard, lower the rate of return and cheapen the cost of service. The responsibility is not shared; it is shouldered by the municipality. There are no contingent obligations, no contingent profits. There is little doubt that this latter type of franchise would be overwhelmingly preferred by security holders.

#### DETERMINING THE COST OF SERVICE

It is to the mutual interest of both the electric railway and the public that any service-at-cost franchise provide the safeguards of that which will cheapen the necessary return and thus cheapen the cost of service. Recognition must be made of the total cost and provision made for currently meeting it. Expenses cannot be camouflaged by creating a system of operating allowances, with its attendant heritage of deficits to be absorbed in the price paid for future service. To use a homely expression of the Supreme Court of Missouri in the Missouri Southern case, "the intake bunghole in the corporate barrel must be opened simultaneously with the outgo spigot."

Adequate provision must be made for maintaining property and keeping equipment modernized through operating expenses. Adequate provision must be made in reserves to insure replacement of property abandoned or outworn. Bond and note discount must be treated as interest cost. That many existing franchise provisions (contrary to all accepted rules of accounting) say that under certain conditions such operating expenses may be absorbed in capital account or that the cost of money may be an accumulated claim to be disposed of on ultimate settlement if not paid on the due date will not reconcile investors to low returns. Provision is, of course, important for the automatic adjustment of rates through the operations of a return reserve and for competent administration by the city of charges imposed upon the service. The advice of the Wisconsin Supreme Court in the "Soo" case in discussing the regulatory law in that State is particularly in point:

Every unnecessary burden imposed upon the railroad impairs its net receipts and diminishes that margin . . . between the amount sufficient to assure a fair return on the value of its property, plus the amount of its fixed charges and operating expenses, and its gross receipts. In this margin the public and the railroad are interested, . . . to waste this margin is to waste the fund in which the whole public is interested. This should never be done for the benefit of the few, as against the interests of the many.

In a like manner the safeguards of the investment will have an important influence on the necessary rate of return. An actual contract to purchase the property and recoup the investment at the termination of the agreement would mean lower cost of money than a mere option to purchase by public ownership. And the security would be further improved and the necessary return lessened if an option were given the electric railway corporation to sell the property to the city whenever it desired. For it is not merely the preservation of the integrity of the investment during the period of the contract but the ultimate disposition of the property which is of concern to the investor and influences his opinion respecting security and attractiveness of the investment. Lack of such safeguards in the past,

under systems of regulation, explain in large part the high rates of return now necessary to attract money into the electric railway business.

The basis of fair value in the service-at-cost franchise also has an important bearing on the rate of return. Investors in estimating their return discount possible appreciation in the capital invested. They are satisfied with relatively low rates of return on certain real estate, for this reason. If the actual investment is definitely determined in the contract, and if a premium is paid upon the taking of the property by the municipality or a successor in excess of such investment, the necessary return is less than where arbitrary determinations of the then present value are to be made in such events. Uncertainties as to the integrity of the investment have a substantial influence on the rate of return, and it may be readily demonstrated that the compensation demanded to insure against this hazard is far in excess of its probable cost. For the tendency of material and labor costs, and the appreciation of realty values would in all probability, with any fair valuation, yield a more substantial compensation in event of purchase than the actual investment.

#### SLIDING SCALE OF RETURN QUESTIONABLE

Service-at-cost assumes that the going rate of return shall be paid on future investment. It necessitates a fixing of the equitable returns on investment existing at the date of the franchise. There seems no reason why the return on prior capital should not be fixed as an amount rather than a percentage of the capital value. This would facilitate voluntary reorganization and refunding of existing issues and the development of a financial plan, under the conditions of the contract, which would rehabilitate credit.

What return need be paid on new capital is difficult to forecast. Existing investors cannot bind their successors, and even were the contract to specify the rate of return to be permitted on additional increments of capital, existing stockholders cannot be compelled to subscribe, nor existing bondholders be bound to increase their holdings. A concurrent underwriting might be arranged for a short period of time and for a definite additional amount, but it would scarcely be to the interest of the municipality to do so.

The safeguards surrounding the investment and return should be such, in the interest of most economical service, that returns necessary in the future will be less than those in the past. On the other hand, the supply of attractive investments with more active participation in foreign markets is certain to increase, and local electric railways must enter into competition for their requirements of new capital. No more practicable plan can be developed for the future than that additional investment be carried at cost. In no other way can future expansion be assured, and the advantages of better credit conditions brought about by the contract and the dealing thereunder, inure to the benefit of the community.

Provisions for the sharing of excess profits and increased dividends with decreased rates have their appeal, but it is questionable whether they will prove satisfactory in the long run. There must, of course, be incentives for betterment and efficiency in any practicable service-at-cost plan, but there is much merit in the claim that these rewards belong to the working organization, the employees and the management, to whom both parties of the contract must look for its successful operation, and not to the investor.



Prospective surplus profits are so readily dissipated by increased requirements for service and increased demands for wages, that their possibility must be seriously discounted. And it will be found that the investor in his deliberate judgment will most certainly prefer a fair return to a combination of meager returns and possible hopes.

#### PUBLIC SENTIMENT IS INVOLVED

This introduction to the subject would not be complete without reference to the problem of public sentiment. One of the explanations for as low rates as 5 and 6 per cent found in some of the service-at-cost franchises is that they represent a compromise to the public sentiment of what is fair and are not an attempt to measure the cost of money. Unless the safeguards to investment and guarantee of return are sufficient to make such a low return attractive to the future investor, the main purpose of the service-at-cost franchise is defeated.

There is no doubt that in the mind of a large portion of the public interest and profits are regarded as an unnecessary rather than unavoidable part of the cost of service. Those who have conducted campaigns of public information appreciate the difficulties involved in correcting fixed ideas as to the nature and necessity of the electric railway's expenditures for interest and dividends. Such elementary facts—as that electric railways must anticipate the growth of cities; that in the interest of cheap service railways must be built with cheap money; that the rental return of capital invested like the wages of labor employed, is part of the cost of service, and that money cannot be legislated into any business except through taxation of the public—require much ingenuity in presentation before any ready acceptance of them is accorded by the public.

Undoubtedly no more favorable time will ever exist for municipalities to enter into franchise contracts which will minimize the cost of money and reduce the cost of service. During a period of prosperity with fares fixed, costs low and returns assured, considerable difficulty would be encountered in persuading existing investors to accede to the proposition which would deprive the investment of its speculative possibilities. The proposition of supply of service at cost twenty years ago would have been received with open opposition. It is only during times of depressed security values, high costs and meager returns that acquiescence can be secured to any plan so radically restricting the possibilities of the investment. Written in 1896 when the pendulum of prices and cost of operation were at the other extreme, Edward E. Higgins in his book on *Street Railway Investments* states:

THE most important circumstance is the nature of the franchise. Will the electric railway be the lessee, the partner or the agent of the municipality? \* \* The agency type of franchise appears to have greater advantages. Prior investment is determined and safeguarded; the return on capital additions is fixed at the actual cost of attracting investment; the service, extensions and expenses are determined and approved by the municipality, and the fares are automatically determined to yield the total cost of service. Safeguards of the annual return \* \* and safeguards of the investment \* \* eliminate hazard, lower the rate of return and cheapen the cost of service. The responsibility is not shared; it is shouldered by the municipality. There are no contingent obligations, no contingent profits. There is little doubt that this latter type of franchise would be overwhelmingly preferred by security holders.

EDWIN GRUHL

The municipal transportation industry in the United States is intrinsically profitable—much more so than abroad. This is due primarily to American peculiarities.

Our national passion for rapid transit forced the introduction of street railways long in advance of their adoption in other countries. "Perpetual" franchises, high fares, freedom from burdensome conditions, all were instantly—almost impatiently—granted in the eagerness for facilities. To-day, these old time franchises are immensely valuable and almost perfectly protect the interests of their owners. This is the first effect of "American energy."

The second is equally characteristic. The average American is careless of small economies. He has no time to "split a nickel;" he despises a penny and, in some parts of the country, will throw it away. He will willingly pay 5 cents to save three minutes in a half-mile ride, and he will doubtless be the same man fifty years hence. Attempts have been made in a few cities to reduce the now almost universal nickel fare. They have rarely succeeded, not always because the reduction could not have been forced, but because no interest could be aroused among the people.

It might appear at first that this argument for the investment value of our street railways is flippant or superficial. It is not. It is fundamental. Americans are free riders, and their insatiable craving for more facilities arouses mingled feelings of gratification and anxiety in the minds of street railway managers.

No one could hope to sell a service-at-cost plan in the face of bullish sentiment of investors such as Mr. Higgins reflects.

Summarizing the discussion, the following conclusions may be stated:

1. Service-at-cost franchises present possibilities of cheaper service to the public through lower returns to capital where the returns are assured and the integrity of investment is safeguarded. Return on the investment is next to labor the largest item of cost of electric railway service, constituting from 30 per cent to 40 per cent of the operating revenues.

2. Neither the writings of economists nor the decisions of commissions and courts establish the basis of fixing or forecasting the rate of return neces-

sary to attract capital. The actual cost of money from time to time must be included in the rate of return provided in service-at-cost franchises if the business is to keep going and growing.

3. The questions as to whether the franchise makes the street railway the tenant, the partner or the agent of the city, what the basis of fair value shall be and what safeguards are needed to insure the prompt payment of return and the certain repayment of the investment have an important bearing on the return demanded by investors. Disregard for these safeguards under present practices of regulation afford a partial explanation of the fact that high returns are at the present time required by new capital in the electric railway business.

4. There must be incentives for betterment and efficiency in any practicable service-at-cost plan, but the question is raised whether these rewards do not belong to the working organization of the electric railway companies rather than to the capital invested therein.

5. Public education is necessary as to the unavoidable nature of returns on investment, the possibility of cheapened service through public co-operation, and the relation of adequate returns on investment to future expansion of the service.

6. Present conditions of high prices and low returns make the present time most favorable for the sale of service-at-cost franchises to investors.



# Electric Railways and Investors<sup>\*</sup>

*The Public Should Awake to the Deplorable Condition of the Electric Railways—Their Financial Condition Is Desperate and Has Been Aggravated by Large Wage Awards—Municipalities Should Realize that They Cannot Be Prosperous without Efficient and Prosperous Utilities, and Commissions Should Grant Reasonable Increases in Rates*

By FRANCIS H. SISSON

Vice-President Guaranty Trust Company, New York, N. Y.



**B**ECAUSE our soldiers are daily returning from the fields of their heroic endeavors abroad, let us not deceive ourselves into believing that the struggle which has just dethroned autocracy is ended. We should likewise avoid the fatal mistake of considering our responsibility to "carry on" fully discharged when the armistice was signed.

The battle that our boys have just fought so victoriously across the ocean has gone on since the dawn of time; it will continue so long as human nature remains as it is to-day and has been through all the centuries. The battle may be waged in the name of democracy or in behalf of this or that cause, but always, in the final analysis, it is the struggle of the lesser thought against the greater thought of the time—the fight for progress—whatever form it may assume.

We may evolve a League of Nations which, perhaps, will prevent armed warfare and the wholesale shedding of blood. Certainly all mankind fervently hopes for such a covenant among the nations. But, notwithstanding, we may be sure that the age-old struggle will proceed. It is going on to-day, in fact, the world over. Under the banner of state socialism the foes of peace are now attacking the very foundation of our national and individual freedom. And we shall have ample need for the same spirit which animated our soldiers "over there" in breaking the Hindenburg line of autocracy to annihilate the "Hindenburg" line of the forces of ignorance and dangerous radicalism here.

## STATE SOCIALISM DOOMED

State socialism can never attain the millennium it extravagantly promised while the mass of people are uninformed about, or worse, uninterested in, the vital economic problems confronting this nation. And when there shall be such general enlightenment and intelligence as are required for the success of state socialism there will be no need, or place, for such specious theories of government, because their fallacy and peril will be apparent to all. Then the people as a whole will understand that the state cannot deprive the individual of the fruits of his initiative and long thrive, or even survive.

That there is a singular and deplorable lack of

appreciation of this fact, however, is plainly evident throughout the land. It is no more pronounced, perhaps, than in the attitude of the people generally toward the public utilities. But, thanks to the costly failure of the government's experiment in controlling the railroads, there may at last come a dawning consciousness among the thinking element of our body politic of the tragic possibilities, as well as fatal limitations, of state socialism.

Let us hope that this awakening will occur before it is too late, in dealing with the problems of the electric railways of the country. And it is with the desire to help disseminate information about some of the fundamental factors of these problems that I shall undertake to discuss electric railways from the point of view of the banker and investor. In this connection, incidentally, it may not be amiss to observe that every progressive banker and investor to-day is well aware that his interests are inevitably and inalienably allied with those of his community as a whole, and that whatever promotes the prosperity and welfare of all the people also profits him. Because the bankers realize this basic principle of their relations to the public, and also because they understand that which the general public does not appear to appreciate, namely, the people's vital financial "stake" in public utilities, they are keenly interested in problems of the electric railways.

## THE PUBLIC'S STAKE

The average person, seemingly, thinks that simply because he owns no public utility securities he is not concerned with the financial condition of these corporations. That is a serious mistake, for the ramifications of the fiscal problems of the public utilities affect, directly and indirectly, every phase of the economic life of the communities they serve.

In June, 1918, substantially all the banks of the country, except private banks, owned \$385,000,000 of public utility bonds. Insurance companies, also, are large holders of such bonds. In New York State, alone, the public generally owns securities of electric railways to the amount of \$1,282,500,000. And more than \$6,000,000,000 is invested in the electric railways of the United States. These figures should be sufficient proof of the fact that direct interest in the welfare of public utility companies is not limited to those who are stockholders in these companies.

Surely the war has taught us that, collectively, the public utilities are national in scope and of incalculable importance to national defense, as well as to national welfare and comfort. Yet, the electric railways, representing an investment of \$6,000,000,000, are rapidly going on the rocks—largely because of public ignorance of, and indifference to, the true conditions of this great industry. The recent receivership for the Brooklyn

<sup>\*</sup>Abstract of address presented before mid-year meeting of American Electric Railway Association in New York, March 14, 1919.



Rapid Transit Company dramatically emphasizes the straits into which the electric railways throughout the country have been forced by various circumstances.

Up to the present, the electric railway companies have struggled alone with this desperate situation, but the problem is really a public one because the functions performed by these companies are essentially public. It is time for the public, which has reaped the benefits of the service rendered by the electric railways despite unbearable handicaps, to share in solving their problems. It is high time, indeed, for the public to realize that when it attacks public utilities, such as the electric railways, or denies them fair treatment, it is attacking and injuring its own interests.

The war imposed unprecedentedly heavy burdens on the electric lines, which were already suffering from a cumulative load that was straining their facilities and resources to the utmost. The prices of materials, for instance, have advanced from 25 to 100 per cent in the last few years. The demands made upon the service of the electric roads likewise have greatly increased. Transportation facilities of electric railways are over-taxed everywhere. But, while gross revenues have probably been larger than ever before during the last twelve months, net income has decidedly decreased.

In view of these deplorable conditions is it surprising that electric railway security owners have seen their holdings precipitately and alarmingly depreciate in value? Is it amazing that, with the opportunities offered to the investing public during the last few years to purchase the securities of industrial companies which have shown extraordinary earnings, electric railway securities should find few buyers? Is it to be wondered at that, with the wartime demands upon capital, these securities should have sold at prices which have been so low that the electric railway companies have had the utmost difficulty in obtaining, and, in some cases, have been absolutely unable to arrange, long-term financing? Is it difficult to understand why they have been compelled to pay such high rates for the capital they did get—and which, of course, still further reduced the return on their securities? Is it any wonder that dividends should be passed and that those to be paid this month, totaling \$3,062,000, should be \$200,000 less than during March of last year?

#### RESULTS OF WAGE AWARDS

I have mentioned some of the burdens laid upon the electric railways by the war as being instrumental in bringing about the existing financial difficulties of these companies and of the unfavorable position of their securities. There is another factor, however, which has contributed largely to the situation, namely, the awards of the National War Labor Board. In this connection, it may be illuminating to quote the following sentence from a letter recently written by the receiver of a New England electric railway company:

The receivership is a direct result of the National War Labor Board's award, which placed an additional payroll burden of \$125,000 per annum upon the company, notwithstanding our having submitted to the board a full statement of our funds and demonstrating to them that any other increase in wages would create the situation which we now face.

In a hearing between the street car companies of Cleveland and Detroit and their men, the companies pleaded that they should not be required to raise wages because they had no income out of which to pay the increase. They said:

We are working under a franchise on which we receive only 3 or 4 cents a passenger carried many miles, and, if a substantial increase in wages be granted, bankruptcy and a receivership must follow.

Yet, the general chairman of the board of arbitrators in these cases held that the *financial condition of the companies could not affect the issue at stake.*

Such rulings, however, are only in keeping with the general public's attitude toward the electric railways and which has compelled these companies to operate under two distinct, and, in some respects, diametrically opposed kinds of law—legal and economic. The seriousness of this handicap is apparent when it is realized that probably one-half of the gross operating expenses of a railroad consists of direct labor costs, which are constantly increasing while the abnormally low rates for the service rendered by electric railways were, in many cases, fixed years ago by special laws or by provisions in ordinances or franchises. The rate of fare, in effect, was a part of the consideration for granting franchises. But the franchise method of fixing rates is too rigid to meet present-day conditions. The franchise, while holding down the charges for the service, does not hold down costs; consequently, costs have rapidly been overtaking gross revenues and have reduced to the danger point the margin between the two.

The commission form of regulation was developed largely with a view to remedying the evils of the rigid franchise method, but the commission form of regulation is losing esteem among the thinking people because of the attitude many commissions have assumed toward the public utility corporations, and because of the condition into which the Interstate Commerce Commission allowed the railroads to drift.

The public utilities have long been laying their case before the state public service commissions, but relief has come very slowly. And now, of all times, the men composing the rate-making bodies of the various states must have the courage to adjust rates to existing circumstances and prevent ruin from overtaking many of these corporations. Their responsibility is a very grave one, both to the utility companies and to the public.

#### THE NEED FOR POLITICAL INTELLIGENCE

There is equal need, also, for a realization by our legislators of their duty toward the public utilities and the holders of the securities of these companies. Business opportunity means nothing, unless we have coupled with it political intelligence which makes it possible of full realization. We look into our own city here, and we discuss the cost of transportation and the economic problems that are involved in public utility problems generally, but what good is the understanding of the economic problems if we have sitting in legislative and administrative halls a degree of political intelligence that absolutely nullifies it, which defies economic law, which refuses to recognize cost of production and cost of service as a basis of price?

We must consider more than the earning power, or franchise terms, or business opportunity, or the trade development that may follow in any given field; we must consider the political angle which, sooner or later, in our form of government determines the value upon which any security rests. We see rising up all over the world this tide of radicalism which has affected every form of business and unless we, as business men, attempt to understand and interpret and guide that radicalism into right channels, it is going to affect the fundamental values in which we all deal.



We cannot expect to take our position in the economic world unless we put into political halls the same kind of intelligence that enters into business organization.

The political angle is having a very important effect upon our business future, and we, as business men, should study that angle and have intelligent opinions about it and be able to vote, through our duly accredited representatives, intelligently, that our business may be protected and conserved.

The adjournment of Congress, leaving the coffers of the railroads empty and the Federal Railroad Administration facing \$380,000,000 of back debts, is an instance of the evils of political domination of business. It is one which the public should ponder well in considering the problems of the electric railways, for municipal ownership would plunge these arteries of transportation into petty, local politics—which would be a worse fate, if possible, than the railroads have endured.

If there were to be any one criticism made of the American people as a people it is that though we have organized a democracy here we do not function as a democracy in many important instances, and we allow economic fallacies of all sorts to creep into legislative enactment. We allow economic fallacies to have political importance, which, if we gave them the attention they deserve and if we realized the bearing that they ultimately have on our own pocketbooks, we would be quick to correct in their inception, rather than to fight them in their fruition; and it seems that is the message of this hour, if ever, in the history of the world.

This condition must be remedied. The causes which have permitted and fostered its growth must be removed.

"The difficulty," aptly declared Lloyd George, "is not with interests, it is with prejudices. People talk about vested interests. It is not the vested interests I am afraid of, it is the vested prejudices. We must sweep aside prejudices."

#### IMMEDIATE REMEDIES NEEDED

But the present critical situation of the electric railway companies cannot wait for a solution of the future; it demands immediate betterment. And there is but one remedy.

Transportation cannot be rendered at less than cost, without the money to make up the deficit coming either from the security holders or the taxpayers, or both. It should be obvious to all that the cost of transportation ought to be borne by the users of transportation, and that some plan should be worked out at once by which such provision is made.

If municipal authorities maintain the position they have held, and unwarranted additions are continuously made to the tax burdens of our communities, the bonds of our municipalities will not be attractive to bankers or investors, and the growth and prosperity of various cities will be seriously threatened. Indeed, as has been pointed out, there is involved in the situation the validity of a huge structure of investment and credit, the undermining of which cannot fail to have far-reaching effects upon general credit and business prosperity, for the credit of our transportation lines cannot be placed in jeopardy and the effects localized or even restricted to these utility companies. Cities cannot be prosperous without efficient utilities, and utilities cannot be efficient without prosperity. Public regulation involves public protection of credit.

There can be no possible justification for imposing

such burdens as are being inflicted upon the security holders and taxpayers to-day in a quixotic attempt to give something for nothing, by allowing the users of transportation lines to enjoy the conveniences provided them at less than cost. Fares must be raised to an equitable basis, for they constitute the only source of income for the electric railway companies.

One of the sanest and fairest views on this vital subject which I have ever encountered, and one of special interest to public utility companies in general and to the holders of their securities, is the following opinion rendered by the Superior Court of Pennsylvania:

A rate that is too low may deprive the members of the corporation of property that cannot be returned, and if too high, the public is unjustly deprived of property. Rates should not be speculative or put in operation for the purpose of determining whether too low or too high. Before that question can be answered, a loss of property might result. The business of rate making should not be an effort to impose on either the public or the corporation; and, while it may be true that some corporations in the past have acted unfairly to the public, that would not justify a confiscatory valuation by the commission or a lowering of rates causing a confiscation. Rate making contemplates fair dealing between the company and the public. When the question of rates to be fixed is before the commission, the value of the whole property and the net return thereon must be considered.

The public is entitled to be served at reasonable rates on the value of the property used in the public service. The company is entitled to a rate that will allow it a fair return. To induce investment and the continuance of capital, there must be some gain commensurate with that of any other business. The mere assurance that the investment will not be confiscated will not suffice.

The very recent final decision of the New Jersey Court of Errors and Appeals upholding the legality of the increase in street car fare to 7 cents in the State of New Jersey, is significant and promising. But, more encouraging, as revealing the extension of an enlightened point of view, it has been almost generally admitted by the citizens of New Jersey that the companies needed the extra revenue if the quality and quantity of service was to be maintained.

Approximately 400 cities have raised fares as war emergency measures, but in many cases the increases have been inadequate and, unfortunately, the companies in some of our largest cities, whose financial burdens are proportionately heavier than the smaller lines, have been denied this assistance.

The electric railway security holders do not seek exorbitant increases in fares; quite the contrary. They are fully cognizant of the fact that it is to their interest, as well as to that of the public, to keep rates for service as low as possible, for low fares benefit the companies through stimulating business.

In facing this situation municipal authorities should not forget that they are holding in their hands the credit of their cities, savings banks, life insurance companies and other investment institutions, and a large portion of the invested wealth of the country.

The problem is not merely local or political, but of nation-wide business importance, and, if it is not fairly met, is capable of having a widespread and disastrous effect on business—an effect which every business interest, directly or indirectly, but inevitably, must share.

"Unless some relief is given," declared A. J. Hemp-hill, chairman of the board of the Guaranty Trust Company, in testifying a short time ago before the Public Service Commission of the Second District of New York, "there will be a cataclysm from which we will not recover for a generation."



# Through a Commissioner's Eyes\*

*Electric Railways Should Get Together in Handling Questions of Municipal Ownership, Procedure in Rate Cases, Valuation and Indeterminate Franchises—Only Known Preventive of Municipal Ownership Is Satisfied Public*

By CHARLES E. ELMQUIST

President National Association of Railway and Utilities Commissioners

GOVERNMENT control and operation of rail, water and wire lines will probably force the issue of government ownership in the 1920 campaign. This is indicated by the testimony and views of government officials and by the action of organized labor and certain groups of farmers and other interests. If the people decide to continue government control or to purchase the properties, a strong sentiment may be expected to develop for municipal ownership of other public service corporations.

While there is no direct relationship between steam railroads and electric railways, the question of ownership is going to be ultimately determined on principle. Should it be decided to purchase the steam railroad and wire systems, there is no escape from the conclusion that public sentiment will also demand the purchase and operation by the people of street cars and other utilities in a great many places.

In a local sense this sentiment will be augmented by the condition which now confronts the electric railway lines. The increased operating costs have forced many companies to secure higher rates in order to avoid bankruptcy, and the nickel fare has become the exception rather than the rule. But every rate increase takes from the customer something which was given to him by contract or by the order of a commission, and he is likely to feel that he has been deprived of his just rights.

Hence in the near future one may expect an insistent demand for the reduction of fares, tolls and charges. Petitions will be filed with the proper authorities challenging the reasonableness of the higher rates. In all such cases the commissions or courts must be governed by the facts presented, because there is nothing more certain than that the regulation of rates must be controlled by facts rather than by sentiment. Naturally, the operating costs and operating ratios of utilities will decrease, but it is more than likely that adjustments will not be sufficiently rapid to satisfy the public demand for reduced rates.

During this period the pathway of regulating officials will not be strewn with roses. If the facts will not permit a reasonable reduction of rates, an agitation for municipal ownership of these plants may be expected. The people will feel that by possession alone can they secure the rates which in many instances were agreed to as a condition precedent to the occupancy of the streets.

These preliminary observations lead me to the following conclusions:

## *Municipal Ownership*

Immediate attention must be given to the question of municipal ownership. Facts for and against should

be compiled and distributed so that the people may have a chance to decide the question upon its merits. The only known preventive is a satisfied public. Efficient service, reasonable rates, courteous treatment of patrons and justice to employees as well as to investors should characterize the conduct of these utilities. No company can successfully defend itself against a hostile public.

## *National Co-operation*

While electric railways are local and perform a service which is largely local, yet their interests are identical in that most of them are confronted with the same kinds of difficulties. It might be profitable for the national organization to continue a study of all questions dealing with improvements and economies in service and to make suitable recommendations to the local companies.

Reforms cannot be made in a month or a year, but if all the managers take hold of the problem in a broad way and endeavor to follow the recommendations of a central body, they will be able to accomplish much to the mutual interests of themselves and the public.

## *Uniform Rate Procedure*

Rate adjustments should be, and as a matter of fact are, largely questions of facts. They involve considerations affecting the revenues and expenses, competition, prospective earnings, investment and value. The controlling principles should be the same everywhere in this country. In the consideration of petitions for reduced rates, the courts and regulating tribunals are entitled to have the questions fairly, honestly and intelligently presented. The same theory of defense should be presented in California and Maine, Illinois and Texas.

A large saving could be made of the time, labor and expense of these utilities, as well as of courts and commissions, if a substantially uniform method could be adopted for the presentation of rate questions. It would seem that such a plan could be successfully worked out by a committee representing the American Electric Railway Association.

Corporations try their cases before courts with great skill and ability, but unfortunately it is a too common practice for them to appear before commissions without proper preparation. Times without number, representatives of the carriers have appeared before the Minnesota commission to favor or oppose a petition, without having agreed upon a course of action, and with no one there prepared to offer an intelligent statement. Each carrier, when called upon, would re-state the opinion of the first speaker. Frequently their cause was just, but it had to be denied because there was no evidence. This practice is not local to Minnesota.

The purpose of a public hearing is to give a fair trial, at which time evidence may be offered by both sides. Hearings would result in a farce if real consideration

\*Abstract of address presented at mid-year meeting of American Electric Railway Association, New York, March 14, 1919.



were not to be given to the evidence in the case. Commissions are busy, and their burdens would be greatly relieved if corporations presented cases in a clear-cut manner. They should give facts instead of opinions, and always bear in mind that public servants are watched and that an order made in a litigated case, which is not supported by the evidence, is arbitrary and illegal and subjects the commission as well as the corporation to serious criticism, and that such proceedings are likely to result in unfriendly legislation.

#### *Accounting Uniformity*

Considerable progress has been made in an effort to establish a uniform accounting system for utilities. It is not always easy to harmonize the conflicting ideas of the accountants who represent the states and the federal government, and this problem is made even more difficult because the views of utility representatives should also be considered. Uniformity is desirable, and every effort should be made to bring it about.

Of course, there may be local conditions necessitating the compiling of special or additional information. As president of the National Association of Railway and Utilities Commissioners, I shall urge the committee on accounting to give special consideration to this matter, and I earnestly hope that real progress may be made during the year. May we not look for co-operation from a committee appointed by the American Electric Railway Association?

#### *Definite Valuation Plan*

Public ownership involves the purchase of the utilities. This is brought about by agreement or condemnation. In view of the prominence which is to be given to the question of municipal ownership, the utilities should not be guilty of "watchful waiting." Preparation should be made for the day when the properties may be taken over. The people should not pay more than the properties are worth, and it is difficult to determine the price in the absence of a physical valuation.

The principles of valuation are not definitely settled. Unfortunately, there are as many different ideas upon this subject as there are lawyers and engineers who make a study of it. Hence it is important that the American Electric Railway Association investigate the problem through a proper committee, authorized to formulate rules and suggestions for the guidance of the companies. A definite plan would be exceedingly helpful to the public as well as the corporations, and it might result in an early judicial determination of the correct principles of valuation for use in purchase, rate-making, taxation and capitalization proceedings. I strongly urge that conservative action be taken by this committee. In the last analysis, nothing is to be gained by claiming everything of present or prospective profit, elements both tangible and intangible, visible and invisible, in the heavens above or the earth beneath.

The steam carriers believed there was advantage in united action. When the government began the valuation, the steam railroads appointed a conference committee, which selected able lawyers, engineers and accountants who were to devote their attention exclusively to this work. This committee brought to the attention of the Interstate Commerce Commission all the law upon the subject, and it compiled a mass of statistical data and expert opinions which greatly aided the commission to arrive at its conclusions in the early valuation cases.

Valuation will play a more important part in rate cases than it has in the past. We seem to have drifted away from the anchorage of contract fares. Rates should be determined by facts rather than by negotiation or compulsion. The public suspects that there is over-capitalization in many of the electric plants. This suspicion will not be allayed until the people know what these plants are really worth.

If the securities are excessive, they should be written down to the basis of the real value of the properties used in the public service. In connection with this subject, it will not do to overlook the fact that original cost is an important element to be considered in arriving at value, and that commissions are insisting that this item be shown.

#### *Indeterminate Franchises*

The experience during the war will result in a greater assertion of authority by the states over the rates of electric railways than heretofore. The rapid increase in the cost of wages, fuel and supplies brought the public face to face with the fact that public service cannot be efficiently rendered by a company which pays out more money than it takes in.

Fixed rates and flexible costs are inconsistent. Every student realizes that both elements must be variable in order to meet changing conditions, and that the determination of the rate to be charged should be made by a body of expert men. Courts no longer attribute sacredness to a franchise rate. The doctrine that a state may fix a reasonable rate for a local utility unless restricted by constitutional limitations has become the accepted law.

We have entered upon a new era in the regulation of local utilities. At this time emphasis should be given to the importance of transferring to the state authorities the ultimate determination of rates, subject of course to an appeal to the courts. The fairest way to meet necessary changes in conditions and to secure for the public, as well as the corporations, that enlightened consideration to which all are entitled, is for the state to issue indeterminate permits in lieu of existing local franchises.

It is not necessary to discuss the merits of this plan. It has been tried out in several jurisdictions and found to be acceptable. The advantages to the companies, the investors and the public are many; the objections, few. Tested by experience and the judgment of earnest and competent men, it seems to come nearer meeting the requirements than any other plan that has been suggested.

But this presents a legislative question, and laws must be passed to suit the needs of a particular state. The American Electric Railway Association should arrange to have prepared an article fully setting forth all of the advantages and the disadvantages of the indeterminate plan. Then all interested parties could have the benefit of the best arguments on both sides of the question.

The extent of state control depends entirely upon local conditions. I have found that state commissions do not relish the idea of exclusive control of street car companies by the state. Many of them believe that the municipalities should retain their powers over these utilities, subject, however, to an appeal to the state commissions. This is not a denial of the right of home rule. It substitutes a board of experienced men for a court in passing upon disputes between utilities and municipalities.

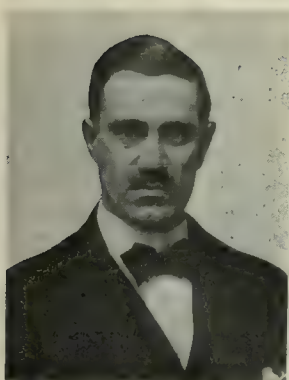


# It Is Time for Valuation Compromise\*

*New Phase of Valuation Subject Is Going to Lead to Agreements Based on a Give-and-Take Policy and on the Mutual Needs of Railways and the Public*

By PHILIP J. KEALY

President Kansas City (Mo.) Railways



THE SUBJECT of valuation has taken up enough space in technical journals during the last ten years for it to be familiar in all of its multifarious details to everyone in any manner associated with the public utility industry. It has received the attention of committees, bankers, lawyers, operators, commissions, engineers, newspapers, civic leagues, reformers and politicians. It has been cussed

and discussed in the degree that it was your valuation or the other fellow's.

Volumes have been written upon the subject in its entirety and upon all of its subdivisions and the subdivisions of the subdivisions. It has contributed a new vocabulary to the engineering profession. It has been theorized upon and moralized about. For these reasons I do not care to try your patience by attempting to touch upon any of the technical or theoretical angles of the question.

Theoretically, a properly conducted valuation proceeding should produce a result that would justly represent the present actual worth of an electric railway property within a reasonable degree of variation. The great difficulty lies in the fact that those determining the value frequently attempt to make the result fit the particular purpose of those whom they represent. Upon reviewing the several values determined for any given property by those representing different interests, one is almost led to the conclusion that while "figures do not lie, liars will figure."

A case in point is mentioned in the *ELECTRIC RAILWAY JOURNAL* of Feb. 8. In the case of a large property the engineers representing the city arrived at a valuation of \$24,346,113; those representing the company, \$30,712,101; the majority report of a franchise committee, \$22,156,951, and the minority report of this same committee, \$15,470,630.

## PRESSING REASONS FOR VALUATIONS

There is nothing new in the subject of valuation, but there is something new in the reason now existing for an agreed valuation for every electric railway property. It seems to be the consensus of opinion that something must be done, and done quickly, if immediate financial disaster to the holders of securities be prevented. Owing to the kindly ministrations of the National War Labor Board already some of the largest, and at one time financially strongest, companies are in the hands of

receivers. Many are operating properties in the interest of the beneficiaries of the War Labor Board and are passing interest payments in order to pay a wage scale which is not possible to the industry as at present organized.

If such conditions are to continue, some plan of operation whereby the traffic pays the cost of operation will have to be devised, because even a receivership will not satisfy the present conditions for long. The plans proposed present two outstanding solutions. The first, which is advocated by perhaps the large majority of operators and which seems the common sense solution of the difficulties, is the service-at-cost theory. In any event this reflects the point of view of those optimists who are not inclined to the idea that crape has already been hung upon the front doors of our offices. The other solution of the situation is presented from the more pessimistic standpoint that the "jig is up" as far as private ownership and operation of electric railway properties go. It holds out as a panacea of all ills the disposal of railways to the municipalities. Either one of these propositions must be bottomed upon the ascertainment of the value of the properties.

## COMPROMISE IS NECESSARY

Unfortunately we cannot in all cases have this value determined by strict adherence to the fundamentals which theoretically and justly should form the basis of every valuation proceeding. We are forced into the position of not only having to fight for the right to earn interest on money actually invested, but we have to battle for a recognition of the investment itself. The dollars which we have poured into these magnificent properties throughout the United States, in the minds of many of those with whom we must finally agree, should shrink to 50-cent pieces in valuation proceedings. In the last analysis we should arrive at a compromise so what we lose from our own estimated value may in some measure be made up through stability given our investment and the possible assurance of getting what we have not had for some years, i.e., the certainty of a fair return upon this value. After all, an adequate guaranteed return upon a dollar is better than nothing upon a dollar and a half.

In entering upon one of these pseudo-political valuations either for the purpose of determining the cost of service or of turning a property over to the politicians, statesmen and job-hungry political engineers, we might as well at once get away from any idea that we are going to determine the value of the property entirely by a slide rule or solely on basic valuation principles. What we are going to do is to agree on one of several different valuation results as purporting to establish cost of reproduction new less actual depreciation. Then from this as a starting point we will try to arrive at some reasonable and fair compromise on

\*Abstract of discussion on report of committee on readjustment at mid-year meeting of American Electric Railway Association in New York, March 14, 1919.



the various other elements of value which distinguish a going concern from the bare-bone skeleton of an electric railway property.

The entire subject of valuation has been upset in the last few years by present material prices. Thus, in the Minneapolis valuation, it is interesting to note that A. L. Drum, consulting engineer for the Twin City Lines, estimated that the property would cost to reproduce under present prices 70 per cent more than the various values determined by the different engineers. In other words, the questions of actual investment and capitalization have been entirely eliminated if in valuation proceedings we receive enough justice to give us an advantage at all from the present reproduction cost. Not even the most extravagant reformer will assert that any property is over-capitalized to the extent of 70 per cent.

The Interstate Commerce Commission in the progress of its \$50,000,000 twenty-year valuation experiment has about come to the conclusion that the steam railroads valued at the present cost of reproduction will show an actual physical value in excess of outstanding securities. I am hopeful that the trend of valuations before courts and commissions will follow this viewpoint; that to a greater extent than ever before the public and the multitude of governing bodies will recognize a fact which has been true of most properties for the last ten years (which is that the outstanding securities represent good hard dollars invested in a public service) and that justice to the investor demands an

honest legal rate of interest upon his money invested.

I am no more pessimistic upon the outcome of valuation proceedings than I am upon the electric railway situation in general. I believe that agreements based on a give-and-take basis over the various items that go to make up the complete value of our systems can be reached, which will place the stamp of authoritative approval upon our outstanding securities. I do not believe that the American people as a whole are in accord with the spirit of "pink tea" Bolshevism evidenced by some reformers who fill the magazines with high-sounding phrases and desire the confiscation of our properties on the theory that political might makes economic right.

There are already a number of examples of valuations reached by agreement with municipalities. In these, while the owners did not get all for which they contended, they at least received a fair value, all things considered. Cleveland, Kansas City and Chicago now have for several years been free from worries arising from the question of valuation.

There are now pending a number of valuation proceedings, noticeably Cincinnati, Buffalo, Detroit and Minneapolis, where the value determined will form the basis for the cost of service.

We have entered into a new phase of the entire valuation subject and the final result is not going to be so much that of the slide rule and the adding machine as one of conference and compromise based on the necessity of a public service and a public need.

## Maintenance and Depreciation Allowances in Service-at-Cost Franchises\*

*An Analysis Is Made of the Allowances on Various Bases Predicated on Existing Conditions—A Suggested Classification of Maintenance and Depreciation Allowances Is Then Outlined*

By A. L. DRUM

A. L. Drum & Company, Chicago, Ill.



ACTUAL experience during the last ten years with the more recent form of cost-of-service and partnership franchises, as well as more clearly defined rules of accounting, has furnished a clearer insight into the requirements for maintenance, renewal and depreciation allowances.

Prior to ten or fifteen years ago the frequent changes and improvements in the art of transportation

had resulted in the custom of meeting from current revenue only the current maintenance, repairs and renewal of the short-lived parts of the physical property, while the renewal or rehabilitation of the major parts of the property was provided for by additions to

the capital account. This was a natural development, as the renewal or rehabilitation of the major parts of the property, which ordinarily should have had a long period of service but were replaced prior to the expiration of their useful life, was required on account of: (a) The improvements in the art of transportation which effected improvement in service and economies in operation, (b) the demands of the public to receive the benefit of new and improved transportation methods, and (c) civic improvements, compelling the replacement of property prior to the expiration of its useful life, such as usable track replaced on account of new street paving being installed.

The changes and improvements in the art of transportation in all but a few of the large cities occurred at frequent intervals. The period of use of the horse-car lines was from ten to fifteen years; cable lines five to ten years; the early electrical development period comprising the single-truck car and belt-driven electrical generators eight to ten years; engine-driven direct-connected generating power stations about ten years. The result of this rapid replacement of usable property was that it would have been necessary to charge a rate of

\* Abstract of discussion on report of committee on readjustment at mid-year meeting at American Electric Railway Association in New York, March 14, 1919.



fare high enough to have provided net earnings of 20 per cent to 25 per cent upon the capital invested during these development periods in order to provide a fair return on the capital risked at that time and the amortization of this capital within the short period, usually about ten years, during which the property representing it was used for transportation purposes.

During the past fifteen years the street railway art has become fairly standardized with respect to tracks, cars and power supply, but it is now apparent that further changes in the art are taking place, particularly with respect to the passenger car, so that a new period of development is arriving. In this period, it is very probable that due to the inadequacy and inefficiency of the present type of car many of these cars will be replaced for service and economical reasons by light-weight one-man cars and light-weight two-car units. In general it seems probable that the principal parts of the street railway system have arrived at a permanent stage of development unless some very radical unforeseen improvement in the art is developed and consequently it seems desirable to place in effect a uniform and standard system of maintenance and depreciation allowances in existing and future service-at-cost franchises.

#### ANALYSIS OF EXPENDITURES BY INDIVIDUAL COMPANIES

An analysis of the actual expenditures for maintenance and renewals made by nine of the largest electric railway systems in the United States during the seven to ten-year period just passed shows a wide variation of these expenditures from the standpoint of the various comparative unit costs. For illustration, the total maintenance and renewal expenditures per year by these properties indicate a variation in fairly comparative cities of from \$2,600 to \$7,400 per mile of single track operated, from \$900 to \$2,000 per car operated, and from 2.9 cents to 5.6 cents per car-mile operated. These actual expenditures for maintenance and renewals represent the actual outgo for all classes of maintenance and renewals of physical property but do not include any unexpended balance in the so-called maintenance, renewal and depreciation reserves of the companies. Consequently, the unit costs are comparative and indicate a wide range of expenditures as between old and worn-out street railway systems and recently rehabilitated and newly constructed systems.

In the case of several of the electric railway systems which have been rehabilitated during the past ten years the average total expenditures, both maintenance and renewals, indicate a yearly requirement of about 13½ per cent of the gross revenue, about 4 cents per car-mile, \$3,000 to \$5,000 per mile of single track operated and \$1,400 to \$1,800 per car operated. Certain of these street railway systems made appropriations of from 18 per cent to 21 per cent of the gross revenue for maintenance, renewal and depreciation, and the part of the appropriations remaining unexpended during the eight-year period has amounted to from 20 per cent to 35 per cent of the total amount appropriated. The physical property of these last mentioned street railway systems has been rehabilitated during the past ten years, and the average age of the physical property would not exceed eight years.

General conclusions reached by a study of the actual maintenance and renewal expenditures of the nine large street railway systems of the country indicate that the

amount required for current maintenance and renewals is extremely variable and dependent upon the age, previous standard of maintenance and present physical condition of the property, so that it is almost impossible to arrive at a uniform standard of appropriations for current maintenance and renewals of street railway properties. It, therefore, seems necessary that in a service-at-cost franchise the amount of the appropriation for current maintenance and current renewals should be determined by the operating board in control of the property year by year and in effect be the actual amount of expenditures incurred by the property for current maintenance and current renewals during each year.

The allowances to be made to cover renewals of the long lived portions of the property require a separate determination for each electric railway system on account of the great differences in age, types of construction and remaining life of the long lived portions of the physical property of the different street railway systems in the country.

Replacements due to lack of efficiency, inadequacy, improvement in the art, etc., will be encountered in the future by all street railway properties, but are in the nature of a contingent liability for extraordinary replacements, each of which should be judged upon its own merits at the time the problem arises and an additional renewal allowance be determined for each specific item in order to spread the cost of these extraordinary renewals over the period benefited, viz., the estimated remaining life of that specific part of the physical property that has been abandoned. In effect, this method means the deduction from property account and a charge against an abandoned property account of the portion of the amount of the original cost of the abandoned property represented by its remaining life when abandoned and the extinguishing of this item by appropriating from gross revenue annually a sum for extraordinary renewals sufficient to equal during the remaining life of the abandoned property item the amount deducted from the property account.

#### CLASSIFICATION OF MAINTENANCE AND DEPRECIATION ACCOUNTS

To state briefly the suggestions made herein, it seems advisable to classify maintenance and depreciation allowances as follows:

##### (A) *Current Maintenance and Renewals*

These expenditures are dependent upon the amount and character of the service and the present physical condition of the property and are widely variable for different properties. Consequently, it seems advisable that the actual expenditures for current maintenance and repairs of the physical property and for the current renewals of short lived parts of the physical property should be provided from the gross revenue of each year as part of the operating expenses.

##### (B) *Renewal Reserve for Existing and Added Property*

The amount of the appropriations to this renewal reserve for the long lived parts of the physical property is dependent upon the replacement cost, age and expected remaining life of the property and therefore should be made annually in sufficient amount to provide for the replacement, at the end of their useful life, of the various parts of the physical property that are not replaced by the expenditures for current renewals as part of the operating expenses.

The appropriation for the renewal reserve for existing property should be determined by grouping the physical property under a classification of the same or similar types and having reasonably close remaining lives, estimating a replacement value and remaining life in years on the various



items of each group, from which the amount of the average annual renewal appropriation for each group may be determined with an allowance for interest accumulations.

The appropriation for renewal reserve for additional property should be determined annually by grouping the added property under a classification of items of the same or similar types and from the actual replacement cost of the property and an estimated life the amount of the average annual renewal appropriation for each group may be determined.

The renewal reserve fund so accumulated should be held for and applied to the replacements and renewals of the portions of the property, the cost of renewals or replacements of which shall not have been charged to current renewals and included in operating expenses. When any portion of the property is retired from service an amount equal to its replacement cost should be provided from the fund and expended on new physical property. In the event of any part of the physical property being withdrawn from service before the expiration of its useful life then only such portion of its replacement cost as is represented by its expired life should be withdrawn from the fund and expended on new physical property.

#### (C) Abandoned or Superseded Property Reserve

Replacements of property due to lack of efficiency, inadequacy, improvements in the art, etc., represent contingent expenditures for the future benefit of the public or the property and represent definite ascertainable losses of capital that naturally should be provided for from future gross revenue.

Whenever any part of the physical property is retired from service before the expiration of its useful life, there should be deducted from the property account and charged to an abandoned or superseded property account the portion of the amount of the original cost represented by the remaining life of the property when abandoned. The amount of this item should be amortized by setting aside from gross revenue annually an appropriation for abandoned property reserve sufficient to equal with interest during the remaining life of the abandoned property item the amount deducted from the property account. The funds derived from such appropriations may be invested in trust funds or in the securities of the company so that there shall be available as a charge against future revenue or invested in new property an amount to offset the capital outstanding and represented by the abandoned property.

## Variables Prevent One General Solution\*

*Electric Railway Problems Must Be Solved in Light of Local Conditions, with Attention to Merchandising, Zoning, Commutation Rates, Lighter-Car Equipment and Possibly One-Man Cars, with Higher Fares Where Needed*

By WILLIAM D. B. AINEY

Chairman Pennsylvania Public Service Commission



IT IS self-evident to all that a satisfactory solution of electric railway problems has not yet been obtained. In that connection I suggest that in no single conclusion does the solution lie. But we will without doubt agree upon the following as essential to the well being of electric railways as efficient public servants: (a) The securities must be stabilized. (b)

They must bear some fair relationship to the money invested in the properties. (c) The revenues must amply provide for operating expenses, reserves, depreciation and a fair return upon the investment. (d) The service must be adequate to the public needs. (e) The fares must be high enough to meet these requirements and enable companies to render that service and low enough to attract sufficient patronage. (f) The rate structure itself must take into consideration services rendered and received, that the costs thereof may be equitably distributed among the ratepayers.

A general program applicable to all companies or to all localities cannot safely be adopted. Unless it can be assumed—and I am firmly convinced to the contrary—that all companies are similar in regard to corporate and financial histories, physical conditions, topographical and geographical situations and localities, character and number of population to be drawn upon, with their riding habits, there are variables which prevent a conclusion with respect to one company being applicable to

another. To illustrate this point—there are in Pennsylvania electric railways which on a 5-cent fare are meeting their increased operating expenses and have suffered no diminution in the dividends upon their capital stock nor defaulted in the payment of bond interest. On the other hand, there are companies which on 6, 7 or 8-cent fares are scarcely able to cope with their operating obligations and fixed charges. Under such circumstances we are forced to predicate our analysis upon particular cases rather than rely upon a composite view of all the companies.

#### A METHOD OF DIAGNOSIS

While we may not generalize our conclusion, we may with reason adopt a method of diagnosing the difficulties of each particular company under consideration and thus reach some fairly accurate if not a satisfactory conclusion. It will at least support a prognosis. In this program of self analysis, let me suggest the following line of thought:

First: With respect to corporate organization. The simpler it is the more efficient it is bound to be. Corporations, in a sense, follow the law of mechanics. Every useless wheel contributes to lost motion. Every corporate complexity not essential to the maintenance of the working organism spells waste in efficiency or money. Every underlying company which has no operating responsibility and exists solely as a conduit for revenues to its stockholders or bondholders, is an economic loss to the operating road.

Second: I need not dwell upon the subject of the proper relationship between the investment and the capital issues, although it is a matter of grave moment to the corporate life and activity of railway companies and presents a situation which brings travail to the soul of many utility companies. Nevertheless, there never can be a stabilization of securities without a recognition of the requirement that they must rest

\*Abstract of address presented at midyear meeting of American Electric Railway Association, New York, March 14, 1919.



upon the bed rock of fair value. I admit that serious difficulties frequently stand in the way of a readjustment, but these are difficulties which often bind the financial freedom of the company.

Third: If a particular company finds itself wholehearted with respect to corporate complexities and financial disparities between its stock and bond issues and the value of its property, it comes to the intimate question of revenues. It goes without saying that every electric railway must receive a gross revenue generously sufficient to maintain its service, care for depreciation and yield an adequate return to its investors. This fact is more easily stated than accomplished. How to secure such an adequate revenue is not a simple question and, I must firmly assert, is not one primarily determinable by public service commissions. The initiative rests with the railway companies, and the accomplishment lies with the company and its patrons.

#### INCREASE THE CAR RIDERS

Theoretically gross revenues are increased by increasing rates of fare; the alternative method, not now overmuch emphasized, is in increasing the number of car riders.

A careful study will, of course, advise every company of the per mile per passenger costs of transportation service. Ignoring for the moment rush-hour periods but not overlooking their importance, let me inquire whether the railways generally have given sufficient attention to the merchandising side of their business to increase the carriage of passengers. I doubt whether energetic campaigns to that end, during these staggering days of high costs, have with many companies received the attention which other lines of business have evidenced for similar purposes. I am not attempting to state this matter argumentatively, and it is mentioned with full recognition of the increased cost which increased service imposes.

The fundamental difference, as viewed by the public, between electric railway service and steam railroad transportation is that the former is a cheaper type of service. I do not believe that difference can in the public estimation be successfully bridged. Companies may promulgate and commissions approve increased rates, but their value is dependent upon a public willing to pay.

In Pennsylvania the curve of lost riders rises very rapidly as rates are increased from 5 to 6, 7 and 8 cents, and the loss in car riders at the higher rates has to be compensated in part by a shortening of car service and lessened operating expense.

In one of our large cities a 5-cent rate was imposed by the company for an inner zone where there was no anticipated increase in the riding habit, and a 7-cent rate was established as an interzone rate and to apply in an outer area surrounding the inner zone. In this outer territory there were fair prospects of an increase in passengers. The actual experience of the company was a material loss in passengers carried under the 7-cent rate and more than 16 per cent increase under the 5-cent rate.

#### ZONING IS PROMISING FIELD OF STUDY

The whole rate scheme of many railways needs readjustment. Let me instance cases where electric railways are carrying passengers from 12 to 16 miles for a single fare. Every passenger so carried is a financial

burden to the company and to all the other car riders of that company. This leads me to the subject of zoning, particularly with respect to interurban and suburban service. It has at least the advantage of usually retaining the short distance rider, and when based upon a carefully studied plan has arguments of its justice to support it.

Zoning is one of the most promising fields of railway investigation, and while I doubt whether it can be made to follow arbitrarily mathematical formulas or be based upon strictly imposed mileage, and while it has perhaps some serious collection difficulties to be overcome, it nevertheless is a subject worthy of the most careful study.

One Pennsylvania company is trying the experiment of an initial zone rate of 6 cents with 3 cents for each additional zone, all of shortened length. It is attempting to meet local objections by some overlaps and is providing monthly commutation tickets at slightly reduced rates to care for regular riders. I shall watch with interest the results with respect both to the methods of fare collection and to the results in passengers carried.

Have the railways in times past sought to rival the railroads in the high class of equipment used for carriage? Will lighter cars and perhaps in some localities one-man cars meet the public requirements at lessened initial costs and lower operating expenses?

In conclusion I have but this to offer—that the electric railway problem is not to be solved except in the light of local conditions affecting each company, and that to its solution we must bring our attention to merchandising, zoning, commutation rates in special instances, lighter car equipment and possibly one-man cars where they can be operated. Increased rates where apparently required must be imposed with a full recognition of the public's veto power. It is an operative rather than a banker's problem, although we may not minimize the importance of the latter angle of approach.

#### RIDING PUBLIC MUST RECOGNIZE FACT THAT ALL COSTS HAVE INCREASED ENORMOUSLY

I would be equally unfair to the electric railways, to the public and to myself were I not to say with all frankness that the very great increases in the cost of labor and material have entered as largely into the expense of railway operation as they have in any other line of business activity, with a result which the riding public in the spirit of fair play and exact justice is in duty bound to recognize. This recognition it has apparently given to almost every other item of daily expenditure. That such recognition requires at its hands in many and perhaps in most instances increased fares to preserve electric railways in a condition where they may continue adequate service is apparent.

The time has not yet come when we may dispense with electric railway service. No other later certain or better form of local transportation has been devised. Electric railway service is entitled in the public interest to public support, and the public is entitled to adequate service but not at a rate less than it costs the companies to provide it.

I have no hesitation in saying that it shall be my earnest endeavor to preserve the carriers in Pennsylvania on a sound financial basis with sufficient revenue to meet the requirements of good service and to yield a fair return to their investors.



# Large Attendance at Mid-Year Meeting

*Delegates, Deeply in Earnest, Endeavor to Reach a Solution of Electric Railway Problems—In Morning Listen to Report and Address by Mr. Gadsden—Afternoon Devoted to Papers from Viewpoint of Operator, Banker and Commissioner*

THE critical condition in the affairs of the electric railways of the country brought a large attendance to the mid-year meeting in New York of the American Electric Railway Association on Friday, March 14. The programs of the technical sessions were devoted almost entirely to financial questions and were arranged so that views of the status of electric railways from the standpoint of the operators and from those of the bankers and commissions could be obtained. The meetings were held in the Engineering Societies Building, 29 West Thirty-ninth Street. The morning session was convened at 10 o'clock.

President Pardee occupied the chair and introduced the sessions with a brief address, a considerable part of which was devoted to a description of the facilities of the association for assisting companies needing special information on different topics, and to the work of the committee on national affairs with headquarters in Washington. He mentioned as an example of the first service, evidence on the value of one-man cars which the association was able to supply to a member company in one of the Southern states. By presentation of this evidence to the Legislature, a bill aimed to prevent the operation of such cars was defeated.

At the conclusion of Mr. Pardee's address he suggested that a committee should be appointed to consider any resolutions which might be offered at the meeting. Upon motion the following committee of five was appointed: P. H. Gadsden, chairman, and Messrs. Henry, Kealy, Mortimer and Ely.

## REPORT OF THE COMMITTEE ON READJUSTMENT

The first subject on the program was the presentation of the report of the committee on readjustment. It was presented by Mr. Gadsden, chairman.

Mr. Gadsden stated that the position taken by the association in the resolution which created the committee was absolutely justified. Statistics prepared by the association show that one-tenth of the total mileage of the United States is to-day in the hands of receivers. Such increases in revenues as have been secured from higher fares are inadequate, and in many cases they have been granted for such short terms as to be of little if any avail in the settlement of the underlying problems.

The committee believes that the questions submitted to it must properly be divided into two phases: (1)

Those dealing with urban electric railways, and (2) those dealing with interurban electric railways. While the conditions of both classes are, in the main, the same, and while the causes of the condition are practically identical, the remedy often differs.

The committee now has under consideration plans which, it believes, will assist in meeting the situation confronting the industry. These will be reported from time to time in detail. In the committee's opinion, there are certain fundamentals which must control the readjustment of the relations between the companies and the communities they serve. Mr. Gadsden presented the following summary of these:

1. The electric railways of the country are breaking down under present conditions of operation. As a result, the public is being deprived of service and is facing certain financial losses through the depreciation of electric railway securities which are held by savings banks, life insurance and trust companies and other similar institutions in which its savings are invested.

2. This condition is primarily due to the economic error of establishing an inflexible fare regardless of the cost of the service rendered or the distance hauled.

3. To correct this difficulty, flexible fares must be established which will be automatically adjusted to the cost of the service demanded by and furnished to the community.

4. A necessary element of the cost of service is such a return on the fund employed as will attract capital to the public service. To provide incentive to enterprise and initiative, there must be an additional reward for economical management.

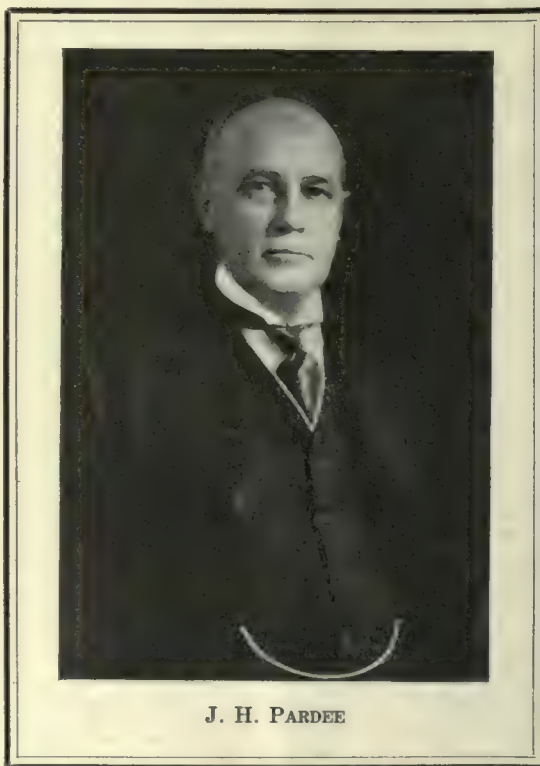
5. In the interest of the car rider, who must ultimately pay the cost of local transportation, every special impost and tax which cannot be justified upon the ground that it is payment for benefits received should be abolished.

6. To secure satisfactory service and keep fares as low as possible, the public must act on the principle of the "greatest good to the greatest number" and must co-operate with the operating companies in making effective economies by the use of "skip-stops," one-man cars, etc.; and the speeding up of schedules by reduction of vehicular interference.

7. Electric railway transportation is a community problem to be solved by the community and the company acting together and animated by a spirit of civic interest and devotion to the public service and having as its objective the establishment of such regulations as will give the public the greatest efficiency, economy and enterprise in the operation of their transportation utilities.

8. The committee proposes to carry out as rapidly as effectively as possible the following program:

- a. To furnish to members of the association at as early a date as possible, information concerning franchise settlements and agreements along service at cost and other lines.



J. H. PARDEE



b. To analyze these various agreements and present for the information of the companies such a summary of their provisions as will provide a guide in the drafting of new ordinances or agreements.

c. To directly assist communities in which the readjustment of franchise relations are under way.

d. To furnish at the instance of the railway company to civic organizations and similar bodies, information as to, and studies of, public utility questions.

In conclusion the committee recommends that the scope of the association's activities be so enlarged as to provide machinery for carrying out these purposes.

After the presentation of the report Mr. Gadsden elaborated the points made by it in an address. He said that the members had been meeting under conditions which had never before confronted the industry. Though the status of the electric railways before the war was discouraging, the war had emphasized the fact that the industry had been predicated on a false economic basis and was now practically in a bankrupt condition. Ten per cent of the properties were in the hands of receivers. During the past year a new phase of the industry had developed and had assumed startling proportions. The public impression up to last year had been that no matter what burdens were placed on any individual property it had to continue service. Whether it was successful or not, it must furnish transportation to the community. The war had brought a realization to the American people that the service must be paid for, and if a community was not able or not willing to pay for this service, the courts would permit a company to junk its property. Thus, in 1918, more than 500 miles of electric railways had been abandoned and the track torn up. The public should realize that if it pushes the railways too far, the people must walk. This aspect should receive more publicity, and the speaker urged the members to take this view back to their respective communities.

Mr. Gadsden then presented two tables, one prepared from statistics obtained from the government giving the status of electric railways in 1912 and 1916, the other made up for ten states from the preliminary reports issued by the census department. The states were Idaho, Wyoming, Vermont, Mississippi, Oregon, Colorado, Arizona, New Hampshire, Connecticut and Rhode Island, thus representing all parts of the country. These tables are presented herewith.

The speaker also presented a table showing the shrinkage in value during the past four years of the securities of seventy-five railway companies whose securities are quoted on various exchanges. They were thus representative of the larger and higher class railways, and showed an aggregate of value of securities in January, 1914, of \$495,157,418 and in January, 1918, of \$245,680,950, or a shrinkage of \$249,476,468. Mr. Gadsden emphasized the fact that these were market quotations and so could not include any watered stock, but were real values. He also explained that these figures did not include the shrinkage in the securities of the Interborough Rapid Transit Company, which alone had amounted to about \$126,000,000. He said that the figures were not cited to arouse electric railway managers to the situation, with which they are fully acquainted, but to give them definite data on the subject so that they could prove the facts to the public.

The speaker said that in his investigations he has not found any other industry or any other phase of human activity which had attempted to do business in violation of fundamental economic principles. The rates of other utilities, such as electric light, gas and

water, were based on cost. No other business had attempted to do business on a flat rate which had no relation to capital or cost. It was essential to get away from this inflexible rate. An electric railway property is not free from the tyranny of the balance sheet, and the only outcome of the present plan is that the railway investors will lose their money and the public will lose its service.

A popular reply when a company asks for an increase is that the patrons do not mind the increase if the company will give the service. The speaker's answer to that was that in every other industry, as compared with the period before the war, patrons are paying a higher price for an inferior service, and are doing it cheerfully.

#### ONLY TWO WAYS OUT

In regard to possible ways out of the present situation, Mr. Gadsden said that in the judgment of the committee on readjustment there are only two alternatives: (1) The general acceptance of some sort of service-at-cost plan throughout the country, and (2) in the event of failure of the first plan, the adoption of some kind of municipal or government ownership. The basic reason for each plan is the same, i.e., private capital will not flow into the electric railway business under present conditions, even in spite of the fact that it is essential to community welfare, and capital can only be secured through some sort of support by means of public credit. It is the duty, however, of electric railway operators as representatives of security holders and as citizens to work out a solution of the problem which will keep the railways in private hands and guarantee the efficiency and the initiative of private enterprise.

Mr. Gadsden pointed out that the primary requisite of any service-at-cost plan is a valuation. Unless the electric railway industry is willing to have the value of the properties ascertained, the service-at-cost idea offers no aid. If it is willing to effect agreements on the subject of valuation, relief along the lines of the service-at-cost idea can be secured in many cases. The questions involved are grave ones upon which the association in the near future must take a positive stand. Some interests may not be benefited under service-at-cost franchises, but these are exceptional cases, for the great majority of the companies are not able to make a fair return upon a fair valuation.

#### SITUATION IN WASHINGTON

Mr. Gadsden also noted the decided change which has taken place in Washington. The claim for federal assistance for electric railways last year was based upon their essentiality in connection with the war program. The problem now before the government is not the winning of the war but the stimulating of buying so as to stabilize the market and restore confidence. The electric railway industry is of such magnitude as to require consideration also in connection with this problem. Involving an investment of nearly \$5,000,000,000, these carriers employ from 350,000 to 400,000 operatives and have a potential purchasing power of at least \$500,000,000. At the present time the industry is prostrate and out of the market. Hence the government has begun a serious study of the electric railway situation, not out of tender sympathy for security holders, but out of a desire to restore the lost buying power of the companies.



TABLE I—COMPARATIVE CENSUS STATISTICS OF  
ELECTRIC RAILWAYS FOR TEN STATES\*

	1917	1912
Gross revenues.....	\$34,966,172	\$31,365,087
Operating expenses.....	24,154,798	17,750,612
Deductions from gross income.....	11,355,858	9,312,755
Net income.....	7544,554	4,301,710
Mileage.....	2,669.23	2,586.20
Number of companies.....	72	76

†Deficit.

\*States included are: Idaho, Wyoming, Vermont, Mississippi, Oregon, Colorado, Arizona, New Mexico, Connecticut and Rhode Island.

Mr. Gadsden recalled that last year the electric railways had the support of practically all of the departments of the federal government, and he added that encouraging support recently came from the Conference of Governors and Mayors which was held in Washington on March 3-5.

Telegrams from chambers of commerce and leading business and industrial organizations in practically every state and every large city had been sent to President Wilson and were turned over directly by him to the committee on resolutions of this conference. The conference then went on record with a resolution, noted in the *ELECTRIC RAILWAY JOURNAL* of March 8, 1919, to the effect that the delegates disclaimed "any disposition to trespass on the rights of municipalities" but earnestly recommended "that the federal government continue its helpful offices with the view to averting serious consequences in the financial affairs of public utilities."

Mr. Gadsden said that there was apparently under way a movement to set up a Federal Utilities Commission composed of representatives of the Department of Labor, the Department of Commerce, the Treasury Department, one or two public service commissions and possibly the electric railway industry. There is no warrant in law for such commission to regulate rates, but it hoped that its deliberations and recommendations would be as effective as those of the Industrial Price Commission, which has been appointed with similar powers to take up the question of fixing prices for certain basic industries. The results secured by a Federal Utilities Commission, of course, would depend upon the personnel and the tact and the forcefulness of the members.

#### CLOSER CO-OPERATION MUST BE GIVEN

In closing, Mr. Gadsden most emphatically directed attention to the vital necessity of closer co-operation on the part of the industry. As a case in point, he mentioned the fact that the companies did not appear to appreciate the great need of co-operating fully with the committee in Washington. For example, the committee received 168 replies to a questionnaire sent out to 1200 companies. It now has in Washington a record of gross receipts for 1918 of only 188 companies, although complete figures should have been on file in Washington by this time. He described forcibly the

ignominious position in which the Washington representatives of the industry are placed, when after two years of steadfast work on their part the industry has not yet given to them sufficient information to make possible a statistical summary that covers the whole situation. He added that the committee itself is unwilling to continue its efforts unless it receives better co-operation on the part of the electric railway companies.

#### Afternoon Session

At the opening of the afternoon session President Pardee announced that the International Shipbuilding Corporation had invited all delegates interested to witness the launching of the eighteenth ship built at Hog Island, the event to take place at 10 o'clock on Saturday. The invitation was extended through M. C. Brush, formerly president Boston Elevated Railway but now connected with the shipbuilding corporation.

Francis H. Sisson, vice-president Guaranty Trust Company of New York, then presented a paper on "Electric Railways and Investors." This paper is published in abstract elsewhere in this issue.

After the presentation of this paper, Mr. Sisson continued by saying that the only answer which the Legislature gives to this problem is municipal ownership and operation, but this, in the speaker's opinion, would be attended with poorer service, higher taxes and costs and less efficiency. The idea that the government could conduct a business better than private initiative was a fallacy. This is a time when the burden of sound thinking rests on business men. The present problems, he said, are not necessarily new but perhaps they are more acute than before. The only solution is that of a higher personnel in politics.

At the close of Mr. Sisson's remarks, President Pardee extended, on behalf of the association, his hearty thanks to him for his paper. Mr. Pardee then introduced Hon. Charles E. Elmquist, president National Association of Railway and Utilities Commissioners, who presented a paper on railways and regulating commissions. Mr. Elmquist was followed by Hon. W. D. B. Ainey, chairman Public Service Commission of the Commonwealth of Pennsylvania, who presented another paper on the same topic. These papers appear in abstract elsewhere in this issue.

After expressing the appreciation of the association to all those who had presented papers, President Pardee announced that the papers were open for discussion.

#### DISCUSSION

Charles L. Henry, Indianapolis & Cincinnati Traction Company, was the first speaker. He declared that he was not prepared yet to attend the funeral of the electric railway industry. Nothing, in his opinion, can take the place of electric railway service, and it must continue. The increase in prices of material and labor had begun long before the war but had come gradually. Electric railway men are not responsible for these conditions, but he did consider that they would now be responsible if they did not make any attempt to correct them. In his opinion there was only one solution—absolute service at cost. As a preliminary, he believed it necessary to determine the value of the railway property. The public is interested in the service and has a right to say what the service will be, but when the question of higher fares is raised, the charge is often made

TABLE II—STATISTICS OF STREET AND ELECTRIC  
RAILWAYS

	1912 United States Census	Treasury Department 1916 Returns	Decrease	Per Cent
Number of companies.....	1,260	1,260		
Number of employees.....	282,461			
Capitalization.....	\$4,708,568,141			
Income.....	579,208,430	\$561,991,749	\$17,216,681	0.3 of 1
Expenses.....	497,782,682	491,949,698		
Net income.....	81,425,748	70,042,051	11,383,697	13



that the company wants to pay dividends on "watered stock." That is the reason he advocated a valuation, but he thought the value of the property is much more than its replacement value. As an example he quoted the case of the old national road, which first required the felling of the timber, then draining, then was a corduroy road, then was a plank road, then became a macadam road and finally was a concrete road. It would be improper to say that the cost of that road was simply the cost of laying the concrete.

Walter A. Draper, Cincinnati Traction Company, said that any service-at-cost plan should consider the item of control in addition to that of valuation and the rate of return. It is not enough to decide merely what the public utilities should receive but it is necessary also to decide what is to be given to the public. No public utility corporation can work out its salvation according to any one cut-and-dried plan, but each individual locality must work out its own problems according to the conditions encountered.

Mr. Draper stated that from his experience he had found that the further one can get away from local con-

ditions to exist there must be sufficient return to induce those who have money to put it at the disposal of these utilities. Several plans have been discussed during the past few years for providing a suitable return upon the capital invested. Any plan adopted should restore confidence to the investor in order to prove satisfactory. Otherwise the government will have to take over these enterprises or the public will have to go without them. Mr. Morgan said that he believed all members of this association could agree upon some plan provided no attempt was made to force each individual to accept definite instructions as to how it would be carried out. No specific method should be emphasized which would tend to antagonize any of the members. A railway business is not one that can be sold out and moved away from when the owners get tired of it. They must go on with it forever.

Mr. Morgan said that a matter which has concerned him very much, particularly during the past year, has been the necessity for developing some point of contact between the federal point of view and that of the communities. The electric railway business is a serious

## Other Speakers at the Mid-Year Meeting



L. M. GARRISON



P. H. GADSDEN



B. A. HEGERMAN, JR.

trol the better and easier it is to accomplish beneficial results. If it is possible to secure satisfactory action from state or federal bodies this appears to work out better than from bodies nearer at home. The great object of any service-at-cost plan is to get an adequate return for the service which railways provide and for what they are expected to furnish.

Randall Morgan, United Gas Improvement Company of Philadelphia, said that he came to this meeting to listen rather than to give advice, for it is at meetings such as this that all must obtain their instruction and gather facts to aid in carrying out their work. Railways are public servants and the law provides that they shall give service which is efficient, continuous and of the highest character. It is for this that public regulation was instituted. When these regulating bodies were first established there appeared to be a feeling of irritation on the part of those coming under their control, but such utilities now feel that it is suitable that they should have these regulating bodies in order to insure satisfactory service to the public.

It is now apparent that in order for the public util-

undertaking. It involves possibly 60 per cent of all the money invested in utilities.

The industry is in great distress and it must get together somehow on a general plan. The private investor is in a position where he no longer trusts anyone connected with the utility business, either operator or regulator. Hence there is the necessity for the doing of something definite.

P. J. Kealy, Kansas City Railways, closed the discussion by saying that as it is necessary to have a little jollity even at a "wake," he would attempt to state some of the more cheerful aspects of the situation. Probably no utility has had more to contend with recently than the Kansas City Railways, with three strikes in sixteen months, the last costing \$1,000,000. In the discussion at the meeting there has been passing through the contributions a strain which makes for encouragement. For example, take the attitude toward the rate of fare. The mere fact that a service-at-cost plan is being discussed is hopeful. Again, 400 or more roads in the country have been able to break away from the 5-cent fare. Another example is afforded by the changed at-



titude of regulating bodies toward the one-man car; where only a few years ago commissions opposed the introduction of this promising improvement they now favor it. Powerhouse economies are increasing too. Who knows but that some power company will develop a super-station, so economical that it will pay railways to take their power.

The owners of securities ought to take more interest in conserving the electric railway business. They are after all the ones most intimately concerned. The manufacturers should help also, as the utility furnishes them an enormous aggregate annual business. It must be remembered that if there is nothing developed to supplant the electric railway it must continue, and this involves the provision of means for supporting it. The attitude of public officials is indicated by a remark made recently by a mayor who said: "These fellows are up against it and must be helped."

Public sympathy also will assist in solving problems, as it did recently in connection with the labor troubles in Kansas City. There is a great deal of support not now used which can and must be enlisted. The situation is not hopeless, it is going to clear. There are manhood, brains and energy enough available to pull the industry up the grade which it is now climbing.

At the close of Mr. Kealy's remarks President Pardee called upon the committee of resolutions for its report.

Mr. Gadsden, in reporting for the committee, presented four resolutions. One extended the thanks of the association for the speakers who had presented papers at the meeting. Another was that the report of the committee on readjustment be approved. A third was to refer the suggestion made by Mr. Taylor in his paper as to dissemination of information on the electric railway situation to the committee on readjustment for its action. The fourth read as follows:

It is self-evident that the electric railways of the United States are breaking down under conditions of operation which have forced a tenth of the railway mileage of the country into receivership; have depreciated securities of the companies so that there has been a shrinkage of nearly four hundred million dollars in the market value of the securities of one typical group of seventy-six companies; have wiped out the net income of practically all corporations furnishing local transportation; have caused, during the last year, the abandonment of about 500 miles of track and which are everywhere threatening a loss of service essential to the communities, so that there is not to-day a company that is earning a normal interest rate upon the cost of its physical property, to say nothing of the other costs of creating the property.

In this crisis a readjustment of the relations between these companies and the public is essential to the preservation of service. A proper solution implies that the fares charged must be so adjusted as to meet the varying costs of furnishing the service.

Such adjustment when made should be adequate to provide for the growing need of the community served.

The American Electric Railway Association, impressed with the gravity of the present crisis, appeals to all national, state, and civic governmental bodies promptly to accord the relief for the electric railways which the facts so clearly justify, and to afford means of placing the electric railways in position to meet the requirements of their respective communities.

These resolutions were all approved. Mr. Kealy then presented a resolution extending the thanks of the association to Mr. Gadsden for his services in Washington, with the Electric Railway War Board, the committee on national affairs and the committee on readjustment. It was adopted by the association by a rising vote. Mr. Gadsden in replying spoke of the great credit which should be given to his associates on these committees

and then said that he greatly appreciated the resolution and that if anything could compensate for his work of the last two years in Washington that did.

In closing the session, President Pardee announced that at the meeting of the executive committee on Thursday it was decided to expand the work of the committee on readjustment. He also said that a decision had been reached to hold a convention next October and that an exhibit might be held in connection with it.

The meeting then adjourned.

### Banquet a Brilliant Success

A DINNER and dance at the Waldorf-Astoria Hotel closed the 1919 mid-winter meeting. Nearly 800 members and guests attended. President Pardee acted as toastmaster at the dinner. He referred to the tremendous extent to which the electric railways have grown in a few years until the per capita rides are 155 per annum and the corresponding gross revenue is \$600,000,000. Unfortunately the net income has fallen to a negligible quantity, partly because the railway men failed to see the coming storm. The present is a time of "isms" of one kind and another and it is difficult to see in what direction the electric railways are tending. However, a solution for every important problem has been found in the past and the present problem of this industry will be solved. All of the people cannot be wrong all of the time, to paraphrase a familiar quotation.

Mr. Pardee introduced Hon. Lindley M. Garrison, former Secretary of War and now receiver for the Brooklyn Rapid Transit Company. Mr. Garrison said that as a newcomer in the railway field he would not venture to discuss traction matters before a railway audience. He then analyzed the plan proposed for a league of nations, urging that the people of this and other nations be given an opportunity to discuss the plan. He expressed the hope that the peace treaty and the league covenant will be kept separate, the latter to be considered with due deliberation after a plan had been made effective to prevent the former Central Empires from again provoking war.

The next speaker was Hon. Francis Burton Harrison, Ex-Governor-General of the Philippines. He paid a tribute to the efficiency of the electric railway system in Manila and explained how the Filipinos are rapidly being prepared for complete self government. They are, he said, loyal Americans. Mr. Harrison defended the league plan at present under consideration, saying that world affairs are now so interwoven that some kind of a world pact is necessary.

The manufacturer members of the association were represented by B. A. Hegeman, Jr., who assured the traction men of co-operation in every possible way, and of the desire of the manufacturers to help in revitalizing the industry. He said, "Your success is our success; your failure, ours." Mr. Hegeman outlined briefly the elements of the present difficulty but said that there is no doubt that much has already been accomplished along the lines of better understanding between the railroads and the public. Those responsible for the operation of the roads must realize the value of taking the public into their confidence, and the people are beginning to believe that the corporations are not quite as black as they have been painted and are showing a much better spirit toward them than formerly, but much remains to be done.



Among other features of the banquet was the unfurling of an electric railway service flag, indicating that there had been 25,893 railway men in the service, of whom ninety-three were known to have died. Mr. Pardee also told of the work done by the association, under the direction of Past-President L. S. Storrs, in preparing for the government a set of 630 maps showing the locations of electric railways, power plants, bridges, etc. This work had been highly commended by the Army officials.

During the dinner there was excellent music and the meeting closed with the general feeling that there is a big work ahead, but that it can be done.

## Executive Committee Meeting of March 13

Convention with Exhibits Was Favored—Desire for Completion of Plan for Affiliated Manufacturers' Association Was Expressed

EVERY officer of the American Association was present at the executive committee meeting held on March 13, namely: J. H. Pardee, New York City; Richard McCulloch, St. Louis, Mo.; T. S. Williams, Brooklyn, N. Y.; R. I. Todd, Indianapolis, Ind.; P. J. Kealy, Kansas City, Mo., and E. B. Burritt, New York City. Other members of the executive committee present were F. R. Phillips, Pittsburgh, Pa.; R. E. McDougall, Rochester, N. Y., and Thomas Finigan, Chicago, Ill., representing the engineers, claim agents and manufacturers, respectively. The manufacturers were represented also by W. S. Rugg, Pittsburgh, Pa., and C. C. Peirce, Boston, Mass. Past-presidents in attendance included Charles S. Sergeant, Boston, Mass.; H. H. Vreeland, New York City; W. Caryl Ely, New York City; Charles L. Henry, Indianapolis, Ind., and J. J. Stanley, Cleveland, Ohio. A number of other men prominently identified with the industry were present by invitation.

Secretary Burritt explained plans for interesting non-member companies in the work of the association and co-operation in these was promised by the men present. The feeling was that the benefits of association membership will be better appreciated now than in the past. It was decided to invite newspaper men to the March 14 meeting in order that full publicity might be given to the proceedings.

### POLICY ON THE SUBJECT OF CARRYING MAIL TO BE FORMULATED

The carrying of United States mail matter by electric railways was discussed, and it appeared that while this business is comparatively small it is important. The committee on national relations was therefore asked to formulate a general policy on the subject with suggestions. A letter from B. C. Cobb, of Hodenpyl, Hardy & Co., was read outlining a comprehensive plan for publicity. It was referred to the committee on readjustment. The executive committee then, after discussion, approved the holding of a fall convention with exhibits, the president to appoint a committee to arrange all details.

Reports of the committee on readjustment, P. H. Gadsden, chairman, were considered. One prepared for presentation to the association was approved for the purpose, and the other which contained recommendations for enlarged work by the association was referred

back for detailed recommendations. The executive committee also approved of co-operation with the Bureau of Standards and with technical and other associations in regard to electrolysis. Mr. Gadsden reported for the committee on national relations (the successor of the war board) showing a substantial cash balance on hand and a record of useful work done. It was decided to continue the Washington office until June 15, the president to make such arrangements for the remainder of the association year, after that date, as he may find desirable.

The executive committee reviewed the status of the manufacturers and it was explained that now that the association has resumed normal activities the report of the sub-committee which is preparing a plan for an affiliated Manufacturers' Association will be ready in time for the convention. This committee was appointed prior to the war period.

### SECRETARY-TREASURER'S REPORT TO EXECUTIVE COMMITTEE

Mr. Burritt reported on the resumption of committee work and other activities of the association. He said that the affiliated associations have resumed active work, but in view of present conditions will confine their investigations to subjects having special importance and application at this time. The Accountants' Association in addition to its usual work will co-operate with the Transportation & Traffic Association in a study of methods of fare collection and registration.

In the Engineering Association the following committees have been appointed and subjects have been assigned each: Committees on standards, equipment, power distribution, power generation, way matters, buildings and structures, heavy electric traction, and electrolysis; joint committee to consider safety code of United States Bureau of Standards, joint committee on standardization of method for determining the cost of power, and committee on issuance and distribution of engineering manual. Representatives from member manufacturer companies have been appointed to each of these.

The Engineering Association will also co-operate with the Transportation & Traffic Association in a study of the operation of one-man cars from a transportation standpoint.

The Claims Association has continued its subscription to the Hooper Holmes Information Bureau and the usual work of the association will proceed.

The Transportation & Traffic Association has this year departed from its former practice in the way of committee work and will undertake but four subjects as follows: (1) Collection and registration of fares, giving consideration to the difficulties presented in the collecting and registering of two or more coins for one fare. (2) Code of traffic principles. (3) Proper basis of compensation to city companies by interurban companies for the use of city tracks and terminal facilities, and proper traffic regulations and contract obligations relating thereto. (4) Operation of one-man cars from a transportation standpoint.

Mr. Burritt stated that there are now 521 company members, 844 individual members and 1319 company section members. He presented a revised estimate of receipts and expenditures, showing an estimated surplus to Nov. 1, 1919, of \$16,900.



## Notes on the Norfolk &amp; Western

SOME interesting facts on existing heavy traction installations were given in a talk on "Railroad Electrification" at the annual meeting of the Engineering Institute of Canada at Ottawa on Feb. 13 by F. H. Shepard, director of heavy traction Westinghouse Electric & Manufacturing Company. In referring to the electric locomotives on the Elkhorn division of the Norfolk & Western Railway, he said that on the lesser grades, trains of 5000 tons are operated, and on the 2 per cent grades trains or 3250 tons, at twice the speed of former steam operation when three large Mallet engines were used per train. With electricity the trains are accelerated to a speed of 14 m.p.h. on a 2 per cent grade in a little more than a minute. The input during acceleration ordinarily equals 12,000 hp., and plans are under way to increase the size of trains so that inputs as high as 18,000 hp. will be reached. On the heaviest grades a second locomotive is used as a pusher.

On account of the length of trains, curvature and the intervening mountains, it was found to be very difficult to communicate to the pushers at the rear even by whistle, so that it was a problem to secure a unison of effort between locomotives at each end necessary to start these large trains. Formerly this was secured by dropping the slack of the train back against the pusher, the bump being taken as a signal for the pusher to open up and help start. With electric operation, this problem has been solved, because at any fixed speed the ammeters on the load engine and those on the pusher are made to read alike, so that each engine takes its share of the load. As the load engine controls the movement of the train, a shift more or less than its share of the load is made, depending on whether speeding up or slowing down is desired. The operator of the pusher is thus advised instantly of such a desire by the indication on his ammeter, so that slowdowns and stops as well are negotiated very smoothly.

During an emergency shortage of electric power on this road, it was found necessary to retire from service four electric locomotives, and sixteen of the heaviest Mallet engines were assigned to the division for emergency service.

## More 1917 Census Figures

IN THE CASE of six more states preliminary figures of the forthcoming quinquennial report on electric railways have been given out by Director S. L. Rogers of the Bureau of the Census, Department of Commerce. Like the statistics for eight states published in the ELECTRIC RAILWAY JOURNAL of March 1, 1919, the additional figures all indicate the tendency of operating expenses to increase more rapidly than operating revenues.

The statistics relate to the years ended Dec. 31, 1917, 1912 and 1907, but only those for the decade are reproduced in the accompanying table. The totals include electric light plants operated in connection with electric railways and not separable therefrom, but they do not include mixed steam and electric railways or electric railways under construction.

New Jersey and Georgia showed general gains during the decade, these being divided between both of the five-year periods from 1907 to 1912 and from 1912 to 1917. Tennessee, however, showed substantial gains in the industry for the first five-year period, followed by somewhat smaller increases, and for some items actual decreases, during the second period. The companies in Tennessee did a much larger light and power business in conjunction with their railway operations in 1917 than in prior years.

The figures for Montana show substantial gains for both periods, and those for Florida a general gain for the decade. In the case of Arkansas the gains from 1907 to 1912 were not maintained during the period for 1912 to 1917.

PRELIMINARY 1917 STATISTICS OF CENSUS BUREAU FOR ELECTRIC RAILWAYS OF SIX STATES

	New Jersey		Tennessee		Georgia		Florida		Arkansas		Montana	
	1917	Per Cent Increase Over 1907	1917	Per Cent Increase Over 1907	1917	Per Cent Increase Over 1907	1917	Per Cent Increase Over 1907	1917	Per Cent Increase Over 1907	1917	Per Cent Increase Over 1907
Number of companies	39		14		14		8		10		6	
Operating	22		14		13		8		10		6	
Lessor	17											
Miles of line	902.09	1.9	332.26	67.0	339.73	31.0	151.73	42.0	94.81	49.4	100.86	74.3
Miles of single track	1,354.35	2.6	462.00	55.3	473.31	35.3	183.03	54.8	131.36	50.3	120.92	74.6
Miles of single track in state (a)			447.36	53.1	449.69	28.0			121.83	48.2		
Cars	3,364	14.8	840	12.4	777	25.7	333	50.7	262	23.6	184	46.0
Passenger	2,980	16.2	761	11.2	697	27.0	280	48.1	232	14.9	156	44.4
All other	384	5.2	79	25.4	80	15.9	53	65.6	30	200.0	28	
Electric locomotives	2		2		1				1			
Number of persons employed	7,461	10.7	2,963	31.2	3,669	49.6	1,029	28.6	645	3.2	486	93.6
Salaries and wages	\$7,888,127	84.7	\$2,238,014	65.7	\$2,838,349	107.7	\$886,192	72.8	\$555,839	42.0	\$572,604	77.7
Total horsepower	18,966	*78.9	53,533	36.1	201,243	430.8	33,905	211.3	16,650	58.5		
Steam engines:												
Number	18		27		28		23		14			
Horsepower	18,966	*78.9	53,483	36.1	57,858	98.7	31,770	266.5	16,650	58.5		
Internal-combustion engines:												
Number			1		1		5					
Horsepower			50		3,000		735	*10.9				
Water wheels:												
Number					37							
Horsepower					140,385	2321.7	1,400					
Kilowatt capacity of dynamos	14,550	*78.2	38,205	48.0	129,282	417.3	34,300	187.4	12,457	69.9		
Output of stations, kilowatt-hours	22,895,276	*87.1	90,682,359	42.5	319,184,303	803.5	31,101,546	97.8	33,080,677	102.4		
Current purchased, kilowatt-hours	245,049,086		79,354,017		45,506,100		97,110		4,360,889		17,927,151	
Passengers carried	555,286,203	60.9	122,655,470	23.6	114,021,766	58.8	38,625,356	73.9	30,525,360	45.9	25,948,387	84.2
Revenue	432,874,767	60.9	101,824,749	38.1	93,640,506	56.9	32,771,128	73.5	26,283,177	53.3	22,196,885	60.1
Transfer	109,970,183	58.6	17,772,205	*22.2	19,000,810	87.1	5,047,468	62.0	3,406,850	10.7	3,052,359	200.7
Free	12,441,253	83.7	3,058,516	13.6	1,380,450	*29.8	806,760	283.6	835,333	20.7	699,143	750.7
Revenue car mileage	68,966,244	23.9	21,400,684	34.4	20,907,644	43.2	7,208,883	64.2	5,917,302	36.6	3,591,815	47.7
Railway operations—revenues	\$22,204,776		\$5,386,465	43.9	\$5,060,481	62.3	\$1,683,350	70.5	\$1,298,744	56.0	\$1,501,383	97.5
Auxiliary operations—revenues	59,305	72.6	2,132,199	204.6	5,086,031	239.3	759,604	99.9	658,187	71.6		
Non-operating income	269,212	43.9	36,333	*2.1	338,601	224.8	1,560		33,336	*43.9	18,500	*87.0
Income from all sources	\$22,533,293	72.2	\$7,554,997	68.6	\$10,485,113	122.1	\$2,444,514	78.2	\$1,990,267	56.1	\$1,519,883	68.4
Operating expenses	\$13,436,048	70.0	\$4,594,774	88.8	\$5,487,899	114.7	\$1,387,107	45.0	\$1,079,569	58.0	\$1,111,411	101.4
Deductions from income	8,174,260	42.0	2,336,533	64.7	3,953,034	251.4	516,556	177.4	649,580	146.4	215,805	78.6
Net income	\$922,985		\$623,690	*0.7	\$1,044,180	0.4	\$540,851	136.7	\$261,318	*20.5	\$192,667	*16.2

\* Decrease of deficit.

(a) Excluding track lying outside of state but owned by companies within state, and including track in state owned by outside companies.



# Zone System for New Jersey

After Extensive Study Public Service Railway Asks for Power to Put in Zone Fares on Distance Basis—Five Cents Is Charge for First Mile, One Cent for Each Additional Mile—Transfers Are Also One Cent a Mile with Readiness-to-Serve Charge of One Cent—Collection System Worked Out—Zone Systems in Other Cities Described—Commission Takes Plan Under Advisement

**A**T A HEARING before the Public Utility Commission of New Jersey on March 11, President Thomas N. McCarter of the Public Service Railway of New Jersey presented the plan of the company for a zone system of fares on its lines in New Jersey. The proposal and the reasons leading up to this recommendation on the part of the company are contained in a printed report of 207 pages, well illustrated with maps and other engravings. Briefly, the report outlines the needs of the company in the way of an adequate fare, and the history of its plea for higher fares before the commission. It then describes the methods followed in conducting an extensive traffic survey on the system and the conclusions reached from this investigation. Finally it recommends a stand-by or ready-to-serve charge of 4 cents and a distance rate of 1 cent a mile, making the fare for the first mile 5 cents, for the second mile 6 cents, etc. In the same way the readiness-to-serve charge for transfers is 1 cent, with a distance rate of 1 cent a mile. The fare is collected on the pay-leave plan, passengers entering by the front and leaving by the back platform. As they enter they receive an identification zone slip or ticket indicating the zone in which they enter the car and this ticket is given up when they leave the car and pay the correct fare.

In presenting the report, Mr. McCarter asked that it become operative on April 1. The commission has taken the report under advisement and will probably announce its decision soon.

## REPORT IS WORK OF A COMMITTEE

After the commission on Sept. 25, 1918, had indicated its desire to have the company establish "an equitable zoning system over its entire territory" and had granted an increase in flat fares as an emergency measure, President McCarter appointed a committee to study the subject. The committee consisted of himself, as chairman; L. D. H. Gilmour, general solicitor, R. E. Danforth, vice-president and general manager; H. C. Donecker, assistant general manager, and M. R. Boylan, general auditor. Dr. Thomas Conway, Jr., professor

of finance of the University of Pennsylvania, was retained by the company as expert adviser. A sub-committee to take active charge of the work was then appointed with Dr. Conway and Messrs. Donecker and Boylan as members. A large staff of clerks, checkers and other employees was assembled, the total number reaching a maximum of 171.

A complete check of the traffic of the entire property was first taken and the results carefully compiled. The

data thus secured furnish a comprehensive picture of the riding habits on the property and are believed by the company to be the most complete body of information in existence concerning traffic conditions on a street railway. These investigations included studies of relative density of population throughout the territory served by the Public Service Railway; the location of factories, theaters, railroad stations and other centers controlling traffic; the co-relation of residential and business districts; the extent and location of new residence construction in the territory served by the Public Service Railway within recent years; the commutation rates on steam railroads competitive with the Public Service lines and the comparative scheduled running time

on steam railroads and electric lines. President McCarter and the members of the sub-committee also visited every city in the United States in which the zone method of fare collection had been tried and the conclusions of their trip are given in the report.

A map of the system is shown on page 525. The railway serves practically the entire State with the exception of the local service in Trenton, the seashore resorts and the distinctly rural districts. It embraces 849.036 miles of track and serves 141 municipalities, having a combined population of more than 2,100,000.

The account given in the report of the traffic check conducted by the company last fall is so extensive that a review of it must be postponed until a later issue. Briefly, however, the study led to the following conclusions which the committee believed that the Public Service Railway should adopt as the groundwork of its zone system:

## Rates of Fare to Be Established in New Jersey

(From Company's Petition)

**P**ASSENGERS boarding cars and paying cash fares shall pay a fare based on a rate of 5 cents for the first zone-mile, and 1 cent for each succeeding zone-mile. A passenger riding in one zone, therefore, will pay a 5-cent fare; a ride in two zones will cost 6 cents, while a ride through ten zones will cost 14 cents.

"A stand-by or ready-to-serve charge of 1 cent is to be made for each transfer, representing a fraction of the cost involved to the company of providing the facilities necessary to be ready to serve the transfer rider. In addition, a charge of 1 cent per zone-mile will be made for each and every zone-mile ridden on the transfer car. Transfers will be issued under the same general regulations as now prevail, concerning the period of time in which they must be used, the direction in which transfers will be given as between intersecting lines, etc."

The company says that it is entirely practicable to collect and account for fares of this kind.



First. That the best interests of the people of the State of New Jersey and of the Public Service Railway would be served in considering the property as a unit, and applying the same system of zoning to the entire property.

Second. That the traffic conditions on the lines of the Public Service Railway are such that a system of central city areas with outlying zones was neither advisable, equitable nor practicable; that each rider should be treated as nearly as possible like every other rider, and that rates should be as nearly uniform as possible for all riders taking journeys of the same length. Thus, no artificial advantage or discrimination would be created in favor of or against any locality; all communities being allowed to develop in a normal manner.

Third. That the above results could be accomplished only by the employment of a series of zones each of a standard length rather than by the creation of certain arbitrary zone areas. It was found upon investigation that the difficulties of fare collection were no greater with a system of zones of standard length than they would be under a system such as heretofore has been applied in this country.

Fourth. In consequence, therefore, the Public Service Railway finally decided upon and herewith recommends a zone-mile system as the most equitable, practicable and desirable method of fare collection upon its lines. Such a system involves the creation of zones of 1 mile in length, having fixed limits, applied to every line operated by the Public Service Railway, a passenger being charged just and reasonable rates, varying with the number of zones through which he rides. It is impracticable to have a zone of lesser length than 1 mile because of the collection difficulties which would thereby be created. Zones of greater length than 1 mile are neither necessary from an operating standpoint nor desirable from a public standpoint, because a wider variation of fares between zones would naturally be occasioned and a measure of unnecessary discrimination, therefore, introduced against those persons whose journeys began or ended within a short distance of a zone point.

#### STUDY OF OTHER METHODS

Before the adoption of these principles, however, or during the months of October and November, after the work of checking the lines of the Public Service Railway, and compiling the results thereof, was well under way, the chairman of the committee on fare zones and the members of the sub-committee visited every city in the United States in which a zone system has been tried. The systems studied were those of the Pittsburgh Railways, the Milwaukee Electric Railway & Light Company, the Bay State Street Railway in Massachusetts, the Shore Line Electric Railway in Connecticut, the Rhode Island Company, the Portland (Me.) Railroad, the Holyoke Street Railway and the Springfield Street Railway of Massachusetts. In addition, visits were made to St. Louis, where the United Railways was studying the matter of a zone system, and to Cleveland, where a study was made of the experience of the Cleveland Railway with the very low fares formerly existing upon the property and the "pay-leave" system of collecting fares. The report summarizes the experience in these cities. While most if not all of these zone systems have been described in this paper, the main features will be repeated here with the conclusions of the committee and data not hitherto published.

#### MILWAUKEE

In Milwaukee, in 1914, the Wisconsin Railroad Commission authorized a zone plan on the basis of a 5-cent fare for the central city area and a base rate of 2 cents per mile on the suburban lines outside the central district. The limits of the central 5-cent area conform substantially to the then city limits, but the corporate limits were disregarded as a controlling factor. In the suburban area the minimum charge is 5 cents, which minimum permitted a passenger to ride through two suburban zones.

At that time the company sold six tickets for 25 cents, good within the central 5-cent zone, and thirty commutation tickets for 50 cents, each ticket being good only for a ride in one zone in the suburban area. Within recent months, the State Railroad Commission has authorized the discontinuance of the tickets referred to, so that now the company collects only cash fares at the rate of 5 cents for the central zone and 2 cents for each suburban zone. The abolition of the special rate tickets produced a reduction in traffic as shown by the fact that the revenue shows an increase of only 12.91 per cent in different months, instead of the theoretical 17.65 per cent which it should indicate.

In general, the financial results of the zone system were more satisfactory than under the system which it displaced. The method of collecting fares is described in detail in the report.

The Milwaukee Company has recently petitioned for larger revenues by suggesting the addition of one extra fare zone within the present central area and an increase in the outer zone fares. The officials of the company are satisfied that the zone system as thus far applied on their property has been a success. However, the reduction of net revenues brought about by the increased cost of operation demands additional revenues which it is expected would be realized by a plan of restricting the central zone and increasing the fares in the other zones.

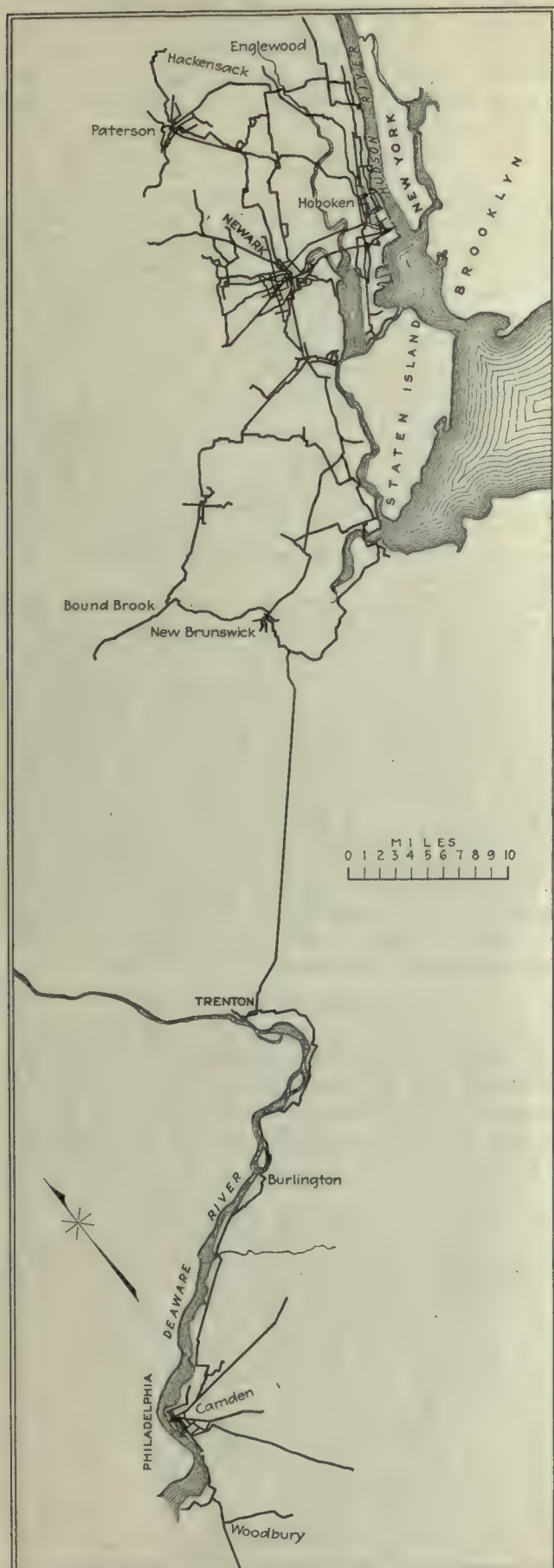
#### PITTSBURGH

In January, 1918, the Pittsburgh Railways increased its flat fare from 5 cents to 6 cents, but sold two tickets for 11 cents and eleven tickets for 55 cents. During the following very severe winter months the service was badly crippled and a comparison of the results obtaining in these months is, therefore, of little value. In May, 1918, however, when the service had again become normal—the car mileage being about 5 per cent below that of May, 1917—the traffic, as compared with that in May, 1917, was as follows:

	Passengers	Passenger Revenue
May, 1917	26,222,000	\$1,139,693
May, 1918	24,392,000	1,165,153
Decrease	1,830,000 or 7%	\$25,459 or 2.23%
* Increase.		

As the revenue produced by this system of fares was insufficient to meet the requirements of the company, a system of fare areas was devised and put into effect on June 20, 1918. The plan as instituted and now in force provides, in substance, for a central 5-cent fare area with a radius of approximately  $2\frac{1}{2}$  to  $2\frac{3}{4}$  miles, the limits being somewhat irregular, with a 2-cent outer zone. The pay-enter-pay-leave plan of payment is followed. There is practically no riding across the center of the city, all but one or two lines looping in the center instead of being through routed. On the basis of the studies made from "on and off checks" the company estimated that some 63,000,000 passengers a year would pay fares wholly within the 5-cent area, while approximately 200,000,000 people would ride in, to or from the proposed outer area. Of the traffic originating in the outer area the company estimated that there would be a 10 per cent loss because of the higher rate of fare. The actual results showed that the traffic in the 5-cent area had been under-estimated, while the traffic in the 7-cent area had been very largely over-estimated. In





MAP SHOWING THE SYSTEM OF THE PUBLIC SERVICE RAILWAY OF NEW JERSEY

other words, the area system has not produced the revenue which was anticipated.

Transfers are given when requested at the time the passenger pays his cash fare, or in other words, when he gets off the car. Should the passenger leave the car in the central area, outbound, paying a 5-cent fare, and secure a transfer, this transfer is good only within the boundaries of the central area. If the passenger rides on his transfer to a point beyond the limit of the 5-cent area into the outer area he must pay 2 cents additional at the time he leaves the car. Transfers are collected as the passenger leaves the car just as is the case with cash fares. Transfers issued in the central area on a 5-cent fare are distinguished by three punch cuts inserted by the conductor at one end of the transfer ticket in a space in which appears the following: "If no coupon attached the hour punched is the A. M. hour." These three punch marks which are in addition to the regular punch marks appearing on the transfer showing the time, the day of the month and the month notify the conductor on the line to which the transfer is given that the passenger has paid a 5-cent fare, and that if he rides beyond the 5-cent limit into the 7-cent area the second conductor must collect an additional 2 cents. Both cash fares and transfers are dropped in a locked fare box as are the 2 cents collected for each transfer issued on a 5-cent fare. Fares are also rung up on an overhead register.

Observation by the members of the fare zone committee and of the officials of the Pittsburgh Railways showed that a large proportion of the passengers who formerly boarded the cars on inbound trips within a distance of  $\frac{1}{4}$  to  $\frac{1}{2}$  mile of the area limit walked to the area limit in order to escape the additional fare. The revenues produced by the plan have not in the opinion of the officials of the company been sufficient to meet the requirements of the property.

#### BAY STATE SYSTEM

The most extensive application of a zone system, from the standpoint of mileage affected, has been on the property of the Bay State Street Railway, operating 928 miles of track covering a large portion of eastern Massachusetts.

For many years the company operated under a system of 5-cent zones varying in length, but on Aug. 31, 1916, the Massachusetts Commission authorized the company to increase the rates on all of its lines except those operating in the large urban districts by advancing the unit fare from 5 cents to 6 cents per zone. This new plan became effective in October, 1916. In June, 1917, the commission authorized the company to increase the fare to 6 cents over the remainder of the system comprising the populous urban districts. The new rate became effective July 18, 1917.

The increase in revenue secured from these changes was, however, insufficient and on June 11, 1918 the commission authorized in all the cities which the company serves, except three—Gloucester, Woburn and the Hyde Park District of Boston—a new inner zone of greatly restricted area, the radius averaging less than 2 miles. Outside this central zone and, as a rule, within the limits of the former free transfer territory, a second zone was created, its width averaging about one mile. The balance of the territory was divided into zones substantially a mile in length.

The cash fare in the city zones thus created was 6 cents and the rate in the interurban mile zones was in



most cases 2 cents. In a relatively small part of the territory the zone charge was 2½ cents and on some of the very sparsely settled interurban lines it was 3 cents. The city zone limits were also the city transfer limits, free transfers being issued upon payment of a 6-cent fare where necessary to enable the passenger to reach his destination traveling in the same general direction.

As an experiment to try to encourage short riding, tickets were sold at the rate of six for 30 cents, good for a ride from any part of the city zone to the traffic center, but not across the center to points beyond. A corre-

in that the multiplicity of fares was confusing to both the riders and the company, the fare collection scheme was almost impracticable, and insufficient revenue was obtained. Great difficulty was also experienced in securing an accurate registration of the fares on the part of the conductors.

After several months of control the receiver, who had taken over the property on Dec. 12, 1917, petitioned the commission for permission to institute a minimum fare of 10 cents with a revision of suburban and city zones so as to place the enlarged city areas on a 10-cent basis and 2-mile suburban and interurban zones on a 5-cent basis. The area of the central city zone was enlarged so as to create a zone having a diameter of approximately 5 miles, including practically all of the built-up territory. The outlying lines were rezoned, the plan in substance being the combination of two 1-mile zones into one new zone for which a fare of 5 cents would be charged. The proposed plan was modified by the Massachusetts commission by providing for the sale of 7-cent tickets, sold by conductors on the cars at the rate of five tickets for 35 cents, each good for a ride within the new city area or for one zone in the country. The minimum cash fare in the country territory is 10 cents.

The simplification of collection and the greater check which was secured on dishonest passengers and conductors was an important reason for the modification of the original zone plan. It was found, moreover, that the use of the many classes of tickets provided under the original zone plan gave opportunity for dishonesty on the part of passengers and conductors, and all city zone tickets, except the new tickets for 7 cents, were abolished at the time the plan now in effect was inaugurated. The latest plan of the Bay State Street Railway is but little different from that which has prevailed for many years on street railway properties. A central area with definite limits for a flat fare is provided, in addition to which a series of 5-cent zones of greatly reduced length are created in each of which a 5-cent fare is collected and registered in the time-honored fashioned.

#### THE RHODE ISLAND COMPANY

The report then contains an account of the zone system which the Rhode Island Company used from May 5, 1918, to Oct. 23, 1918, and which has been described in past issues of the *ELECTRIC RAILWAY JOURNAL*. The results from a financial point of view the report says, were unsatisfactory, and on Oct. 23 the company reverted to a system of flat 5-cent zones. The former zone limits were revised so the new scheme provided for a central zone with a 2-mile radius, a second zone of approximately 1½ miles in length, with succeeding zones of approximately 1½ miles each in length. A flat 5-cent fare is charged in each zone. The revision in rates thus accomplished provided 10-cent fares in the built-up area in the city of Providence. There is very little riding in Providence from one side of the city across the business center to points on the opposite side. Only 3 per cent of the traffic crosses the central zone. A 1-cent charge is made for transfers which are good only within the central zone. Fares are collected at zone limits with the Rooke register. With one exception no overlaps exist. The increase in revenue following the introduction of this system, while substantial, was not sufficient to meet the obligatory payments involved in operating expenses and fixed



MAP SHOWING POPULATION DENSITY, ESSEX DIVISION, PUBLIC SERVICE RAILWAY

spending ticket was sold at the rate of six for 25 cents, good within the same limits but during the off-peak hours only. Suburban tickets were sold at the rate of seven for 50 cents on which the passenger could travel from any point in the first zone outside of the city zone to the traffic center of the city zone; and a corresponding ticket was sold at the rate of four for 25 cents, good between the same limits during off-peak hours only. Several other classes of tickets were provided under order of the commission.

An extended account is given in the report of the system of fare collection and registration used with these fares from June 24, 1918, to Jan. 7, 1919, and of the modified system used after the latter date. The results, however, secured under these rates were unsatisfactory



charges, with the result that on Jan. 30, 1919, a receiver was appointed for the company.

PORTLAND RAILROAD

On Aug. 2, 1918, the Cumberland County Power & Light Company, controlling the Portland Railroad, which furnishes electric railway facilities to Portland, Me., and surrounding territory, instituted a zone system of fares.

The plan in substance provided for the creation of a 6-cent central zone with a radius of 3 to 4½ miles, the limits of which practically coincided with the old 5-cent limits. Three lines, within this central zone, for local reasons, carried passengers for 5 cents, but 1 cent was charged for transfers on these cars. Outside the central zone, on most of the suburban lines, the fare was 2 cents per mile-zone. In a few cases the outer zones were 4 or 6-cent zones. During August and September the increase in revenue over the corresponding months of the preceding year was approximately only \$1,800, of which \$1,400 came from the sale of transfers. This was considerably less than estimated.

On March 2, 1919, with the approval of the commission, the company put an increased fare in effect. This new system subdivides the old 6-cent central area into three 2-cent zones. The old 4-cent and 6-cent outer zones were also divided into 2-cent zones. The new system provides for the use of tickets in the place of cash and curtails the transfer privilege. No tickets are sold for a single ride. The passenger when he boards a car either pays a 10-cent cash fare to the conductor and obtains a 4-cent rebate check, or he purchases from the conductor a ticket good for five rides within the central zone area at a cost of 30 cents, and has one coupon punched which entitles him to ride through not more than three fare zones. The passenger who boards a car without a ticket, pays a cash fare and, riding in more than three zones, pays the conductor for his ride at the cash rate of 3 cents per zone; for each zone fare thus paid in cash the conductor will issue a rebate check good for 1 cent. For example, a passenger who boards a car without a ticket and rides through six zones pays the conductor 18 cents and receives six 1-cent rebate checks. In all cases the passenger is entitled to receive a sufficient amount in rebate checks to reimburse him for the difference between the cash fare rate and the ticket rate. Rebate checks will be redeemed only if presented for redemption not later than the following day at places designated by the company. Conductors are not permitted to redeem rebate checks or tickets.

RESULTS IN OTHER CITIES

The report also describes the zone systems used on the Shore Line Electric Railway and the Springfield and the Holyoke Street Railways. It also describes the

FARE STATISTICS OF HOLYOKE STREET RAILWAY SINCE ZONE SYSTEM BECAME EFFECTIVE

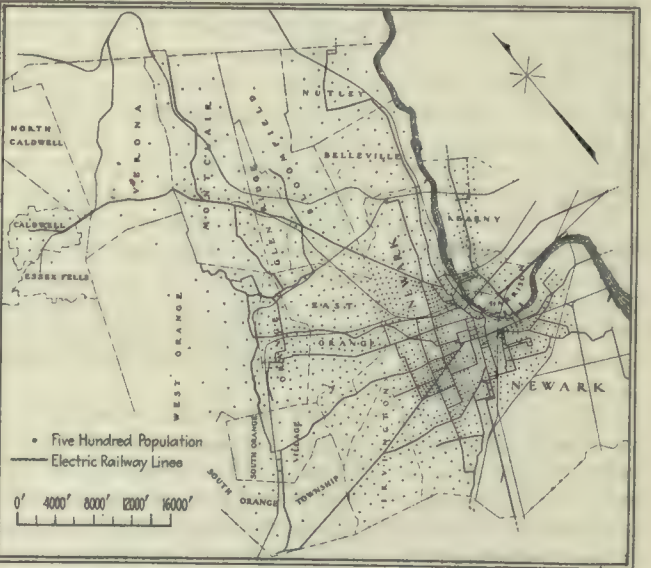
1918	Amount of Increase or Decrease in Revenue	Per Cent of Increase or Decrease in Revenue
February (18 to 28, inclusive)...	\$634.39	12.89
March .....	586.88	1.06
April .....	191.18	0.36
May .....	4,062.69	7.28
June .....	1,680.44	2.67
July .....	12,118.31	12.87
August .....	1,611.01	2.22
September .....	1,003.50	1.62
October .....	17,111.07 <sup>1</sup>	12.85
November .....	11,668.14 <sup>2</sup>	22.50
December .....	732.33	1.32
1919		
January* .....	17,588.94	35.21
February (1 to 17, inclusive)...	12,275.78	49.24

\* New system of fares effective Jan. 1, 1919.  
<sup>1</sup> Indicates decrease.  
<sup>2</sup> Decrease due to influenza epidemic.  
<sup>3</sup> Decrease due to seven days' strike; no cars operated.

system proposed at St. Louis. No attempt will be made to abstract those parts of reports here except to give the accompanying tables relating to Springfield and Holyoke.

CENTRAL ZONE NOT PRACTICAL IN NEW JERSEY

The study of the traffic count conducted by the committee showed that for the conditions existing in many parts of the property a central zone was not practical



MAP SHOWING POPULATION DENSITY, HUDSON AND BERGEN DIVISION, PUBLIC SERVICE RAILWAY

and that it would bear with especial severity upon factory workers in Newark, Jersey City and some of the other communities served by the company.

With a central zone, whose radius was determined by the average distance which the company could afford to haul passengers traveling therein for a 5-cent fare, the greater proportion of the manufacturing establishments would lie in the outlying zones. The consequence would be that those journeying from these manufacturing establishments, or other traffic centers situated in the outlying zones, to residential sections just within the limits of the central zone would pay a fare considerably higher than other classes of riders within the same community. The individuals to whom such a system would appeal are those employed at or near the traffic center of the city; or, in other words, those employed or conducting business in office buildings and retail establishments or in such manufacturing enterprises as are situated in proximity to the great traffic centers, which would naturally be taken as the center of the central zone.

FARE STATISTICS OF SPRINGFIELD STREET RAILWAY SINCE FARE INCREASES BECAME EFFECTIVE ON MAY 1 AND SEPT. 16, 1918

Month	Passenger Revenue	Revenue Passengers	Passenger Revenue, Increase or Decrease	Per Cent of Increase or Decrease
May, 1918 .....	\$210,045.32	4,238,110	\$29,722.04	16.48
June .....	212,627.41	4,338,295	22,187.12	11.65
July .....	228,855.10	4,491,873	26,171.87	12.91
August .....	233,206.17	4,618,352	24,199.29	11.58
*September .....	235,565.81	4,181,016	3,072.75	1.32
October .....	185,878.59	3,216,397	125,542.73	12.08
November .....	211,910.81	3,654,509	22,106.30	11.65
December .....	236,326.89	4,022,483	30,170.44	14.63
January, 1919 .....	232,775.83	4,040,772	43,529.85	23.01
*September 1-15 .....	120,693.13	...	\$2,070.31	1.69
*September 16-30 .....	114,872.68	...	5,143.06	5.69

† In brackets decrease.



Moreover, the conditions on the Public Service Railway are very different from those of many other companies in that in northern New Jersey a very great part of the travel is from people traveling to and from the end of the line, i.e., to or from the ferries to New York, while in Southern New Jersey the same condition prevails as regards Philadelphia. The conventional situation of a thickly populated district of restricted area with a gradually diminishing density of population as one travels from the center of the city, the suburbs finally melting away into rural districts, is not typical of conditions on the Public Service Railway.

#### DETERMINING THE ZONES

After the zone-mile system was decided upon, much study and thought was given to the most equitable and practicable method in applying to the lines of the company. The first step concerned the question as to the point which should be taken as zero, or the place from which the zoning should begin. There are certain points on the system at which a very large volume of travel originates, and as these represent the beginning and ending of the journeys of a large proportion of the persons traveling in the region surrounding these points, they were selected as zero points. The zoning of each route was then undertaken. An endeavor was made to approximate as nearly as possible a mile in distance for each zone, departing from this limit only in cases whereby a reasonable exception would bring about the location of a zone point at a natural traffic dividing line, such as an intersection with another line, a point of heavy loading due to the existence of traffic-controlling industries, railroad stations and the like, although a general tolerance rule of 500 ft. was adopted, that is, where the exigencies of the case seemed to call for it. It was found by the sub-committee that in applying this rule the property admirably adapted itself to the zone-mile plan.

Wherever possible, transfer intersections were fixed as zone limits, and as stated before, points of heavy loading were similarly adopted. The adoption of the transfer intersection as the zone limit, where possible, is important in that it tends to permit the passenger to take advantage of a full zone at his mileage rate instead of paying for a short distance which might be necessary were the transfer intersection disregarded and the zone limit placed a short distance therefrom. A characteristic exception to the literal observance of the zone-mile is where two lines pass a common point and reach another common point by different routes, as it is obviously impossible, except in cases where very heavy variation obtains, to bring about a condition which would involve two zones on one line and three zones on another line between such points. Another of the principles adopted was that of fixing one zone limit for all the lines operating across the same point, as any other rule would establish varying rates of fares between two points.

#### DETERMINING THE FARE

The next question was that of determining the proper fare. To do this the estimated operating expenses for 1920 were first segregated into four groups as follows:

- Expenses independent of traffic, varying with the track-mile.
- Expenses varying with the car-miles run.
- Expenses varying with the car-hours run.
- Expenses varying with the passengers carried.

Summarizing these figures the committee obtained the following results:

For Passenger Traveling	Stand-by Cost, Cents	Movement Cost, Cents	Total Cost, Cents	Fare Recommended, Cents
1 zone-mile.....	4.03811	0.99007	5.02818	5
2 zone-miles.....	4.03811	1.98014	6.01825	6
3 zone-miles.....	4.03811	2.97021	7.00832	7
4 zone-miles.....	4.03811	3.96028	7.99839	8
5 zone-miles.....	4.03811	4.95035	8.98846	9
6 zone-miles.....	4.03811	5.94042	9.97853	10
7 zone-miles.....	4.03811	6.93049	10.96860	11
8 zone-miles.....	4.03811	7.92056	11.95867	12
9 zone-miles.....	4.03811	8.91063	12.94874	13
10 zone-miles.....	4.03811	9.90070	13.93881	14

#### COMMITTEE'S CONCLUSIONS AS TO FARES

The rate of fare, therefore, which was recommended to the commission is as follows:

*First.* Passengers boarding cars and paying cash fares shall pay a fare based on a rate of 5 cents for the first zone-mile, and 1 cent for each succeeding zone-mile. A passenger riding in one zone, therefore, will pay a 5-cent fare; a ride in two zones will cost 6 cents, while a ride through ten zones will cost 14 cents.

*Second.* A stand-by or ready-to-serve charge of 1 cent is to be made for each transfer, representing a fraction of the cost involved to the company of providing the facilities necessary to be ready to serve the transfer rider. In addition, a charge of 1 cent per zone-mile will be made for each and every zone-mile ridden on the transfer car. Transfers will be issued under the same general regulations as now prevail, concerning the period of time in which they must be used, the direction in which transfers will be given as between intersecting lines, etc., etc.

#### REST OF REPORT

A digest of other parts of the report will be made in later issues. These later abstracts will include some particulars of the traffic count conducted by the company and a detailed description of the proposed method of fare collection.

#### "Don't Talk to the Motorman"

THE Northern Ohio Traction & Light Company has adopted a simple "silent reminder" of this rule. It consists of a card 2½ in. x 5½ in., reproduced below. Motormen are expected to carry a supply of these cards in the upper left-hand coat pocket. Whenever a passenger, policeman, fireman, or other employee attempts to engage the motorman in conversation, the motorman does not reply but hands over his shoulder to the interlocutor one of the silent reminder cards. This is part of the safety campaign which the company is now conducting.

#### Safety—Co-operation

#### DO NOT TALK TO THE MOTORMAN — A Silent Reminder —

We want to carry YOU SAFELY to your destination. Whenever YOU speak to the motorman YOU temporarily distract his attention.

Whenever he looks at YOU and listens to what you are saying, he concentrates his mind on that and not on the operation of his car. This increases the danger to YOURSELF and others and might cause an accident.

We ask YOUR co-operation to avoid accidents.

Do not TALK to the MOTORMAN.

THE N. O. T. & L. Co.





BANQUET IN HONOR OF RETURNED SOLDIERS AND SAILORS OF THE CHICAGO ELEVATED RAILWAYS

Banquet to Service Men

Chicago Elevated Railways Gives Welcome Home Banquet to 230 Returned Soldiers, Sailors and Marines

ON MARCH 4 a reception and banquet in honor of their returned soldiers, sailors and marines was given by the Chicago Elevated Railways in the Auditorium Hotel, Chicago. Complimentary tickets were given to all of the returned men, and any other employees were invited at a nominal charge of \$1 per plate. The returned men up to that time numbered 320 and there were between 600 and 700 persons present at the banquet.

Following the dinner President Britton I. Budd paid a tribute to those who had gone and those who had remained to "keep the home fires burning." Among other things he said:

"This meeting being held to-night in honor of our returned soldiers and sailors is something in the nature of a family reunion. We are gratified to know that so many have come back unscathed to rejoin the family circle. A few will not return to us. They gave their lives in the greatest cause the world has ever seen, and although we miss their presence here, we can console ourselves with the thought that the cause for which they made the supreme sacrifice lives and will continue to live. Some who are with us to-night have suffered severe and painful wounds. To them we offer our sympathy, while we rejoice that their lives were spared. Some who wear the uniform among us to-night did not have an opportunity to take an active part in the great battles of the recent war. They, nevertheless, are as much deserving of our thanks as if they had. They were ready and we know that they would have acquitted themselves creditably had the opportunity presented itself. We welcome them all, and I wish to say on behalf of the Chicago Elevated Railroads that every man who left to enter the service of our country will find, when he returns to the company, his old position open to him."

In speaking of what those who remained at home had done to help win the war Mr. Budd referred to the Elevated war record which was as shown in the following table:

Employees in active service.....			656
SUBSCRIPTIONS TO LIBERTY LOANS			
Subscribers			Amount
First .....	2,470.....		\$175,850
Second .....	1,994.....		155,550
Third .....	4,047.....		267,950
Fourth .....	5,486.....		409,100
			\$1,004,450

CONTRIBUTIONS TO WAR ACTIVITIES

February, 1918	
War Community Service Fund .....	\$5,937.97
November, 1918	
United War Work Fund .....	\$10,873.50

Other speakers were W. S. McClenathan, secretary of Local No. 308; Samuel Insull, chairman of the board of trustees, and some returned soldiers and sailors.

Draft Status of Electric Railway Employees

THE second report of Provost Marshal General Crowder to the Secretary of War in regard to the operations of the selective service system up to Dec. 20, 1918, contains in one of the numerous appendices an industrial index which shows how the draft affected electric railway employees. The figures follow:

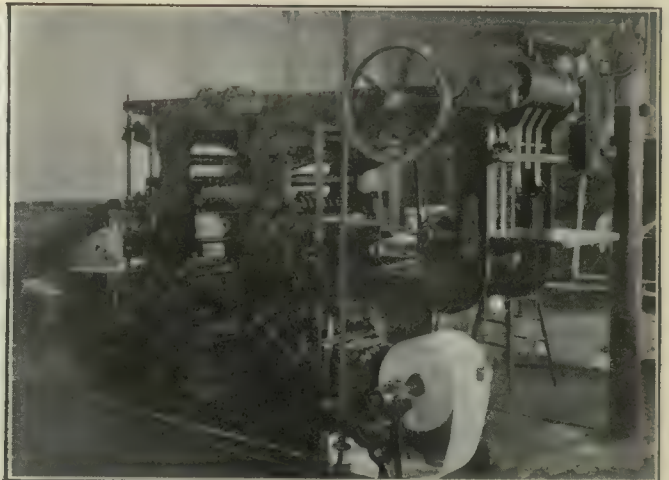
	Male Employees of All Ages	Ages 21-30 Within Selective Service Law		Deferred Classes Within Selective Service Law			Class I Within Selective Service Law		
		Number	Per Cent	Number	Per Cent of All Ages, 21-30	Per Cent of All Ages	Number	Per Cent of All Ages, 21-30	Per Cent of All Ages
Conductors..	65,471	17,777	27	13,376	75	20	4,401	25	7
Motormen...	67,855	15,777	23	11,432	72	17	4,345	28	6
Laborers....	31,978	28,872	90	4,580	16	14	24,292	84	76
Officials and superintendents.....	2,798	163	6	118	72	4	45	27	2
Switchmen and flagmen.....	2,476	399	16	307	77	12	92	23	4
Inspectors...	2,640	366	13	281	77	10	85	23	3
Semi-skilled employees.	5,965	2,638	44	1,852	70	31	786	30	13

The registration covered by the foregoing figures is only the first, that of June 5, 1917, covering the ages 21-30. The second registration, covering the age 21, on June 5, 1918, and the third registration, covering ages 18-20 and 32-45, on Sept. 8, 1918, are not represented. The figures for the total number of employees were projected from the thirteenth census.





A SECTION OF UNITED RAILWAYS OF ST. LOUIS PRINTING DEPARTMENT, CONTAINING FOUR PRESSES AND A SPECIAL ENVELOPE MAKING AND PRINTING MACHINE



ROTARY PRINTING PRESS WHICH TURNS OUT 240,000 TRANSFERS AN HOUR PRINTED WITH TWO COLORS ON EACH SIDE, NUMBERED, DATED AND FOLDED

## A Complete Printing Department for an Electric Railway

St. Louis Company Installs New Rotary Press to Handle 700,000 Transfers a Day—All Other Company Printing and Binding Also Done in Own Shop

THE United Railways of St. Louis inaugurated its own printing department for transfers in 1904, installing at that time a Harris automatic press giving two colors, and also numbering, dating and perforating the transfers in one operation. As the company gradually increased in size the number of transfers demanded was greatly increased and a second Harris press was installed. Later the double transfer came into use and this necessitated the installation of two folding machines. Instead of the issuing of a transfer on a transfer the whole operation, on this system, is handled by the first conductor, who issues a double transfer folded back to back. Both are punched in one operation.

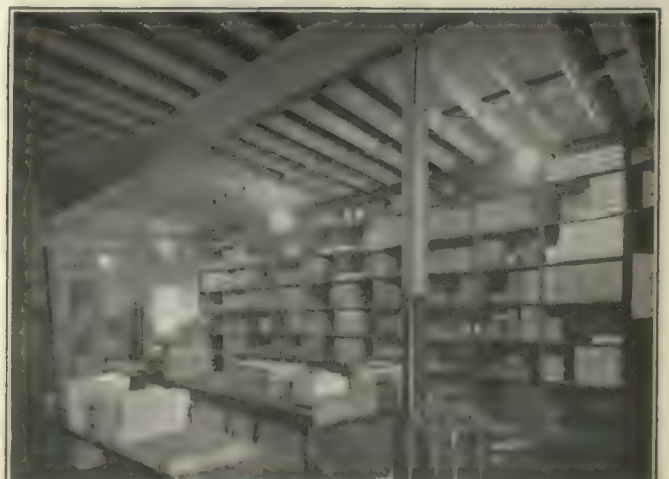
Thus this means no extra work for the first conductor and eliminates the necessity of the second conductor duplicating the operation of the first.

The company operates more than 450 miles of city and suburban lines with about 1600 cars, and the daily demand for transfers amounts to approximately 700,000. The two Harris presses have given a combined output of from 175,000 to 200,000 transfers an hour, but when advertising has been placed on the back of the transfers, as is frequently done, this has necessitated a second run and consequently cut the production in two.

It was deemed advisable to increase the facilities to provide for both present and future needs and a Meisel



SECTION OF PRINTING DEPARTMENT SHOWING HARRIS PRESSES AND NEW JERSEY STITCHING MACHINES.



STOCK ROOM OF UNITED RAILWAYS PRINTING DEPARTMENT SHOWING COMPLETE LINE CARRIED



rotary press was installed late in October, 1918. This press running at normal capacity turns out 240,000 transfers per hour complete, printed with two colors on each side, numbered consecutively, dated and folded. The old Harris presses required flat sheets 12 in. x 18 in. and printed eighteen transfers to the sheet, while the new Meisel takes a 12-in. roll and makes 20,000 impressions an hour, with twelve transfers per impression. With the Meisel in operation one Harris machine and two folding machines have been shut down. The second Harris will serve as an auxiliary machine and **will be kept busy on special work.**

From the Meisel press the transfers go to the stitcher and are stitched into packages 100 sheets thick for the single transfers and fifty sheets thick for the double transfers. These packets are then taken to the cutter and cut into books, about thirty books at each operation, and then to the packing room where they are placed in containers each holding enough for one day for a single line. Some thirty lines are included in the system and the transfers for each bear the name of that line in large type. As this necessitates a change of plate for the run on each line the machine has to be frequently shut down for a short interval.

Transfers are printed thirty days in advance of the date upon which they are to be used. If some unforeseen occasion arises during that interval and notification of the number of extra transfers needed is received by the printing department in sufficient time an extra emergency run is made. To provide for conditions which cannot be taken care of in this way the company has an emergency transfer on which is printed a calendar for each month and each day of the month with a list of the various lines. These are punched at the outlying stations, fifty sheets at a time, by special punches. The gross consumption of paper for transfers amounts to from twelve to fourteen carloads a year.

In addition to the printing of transfers the company maintains a complete printing department. Here is printed the monthly company publication known as the *Bulletin*, all brief work such as annual reports, petitions to the Public Service Commission, etc., all record forms, including more than 1000 different varieties, all car card color display company advertising and dashboard signs, children's and 6-cent tickets. In addition many special filing envelopes and devices are made, leather and cloth book binding is done, including the binding in three-quarters leather of the issues of the *ELECTRIC RAILWAY JOURNAL*, and various leather novelties such as brief cases are occasionally turned out.

Most of this work is accomplished in a room approximately 100 ft. square in which is located the following equipment: One 10-in. x 15-in. Gordon press, one 12-in. x 18-in. Gordon press, one cylinder press, one Meisel press, two folding machines, one National rotary perforator, two Harris presses, two special New Jersey No. 4 wire stitching machines, one 34-in. Seybold cutter, one S. & T. punching machine, one Rosback power stitching machine, and the usual equipment of a composing room.

In addition to this equipment special mention should be made of a machine which has been especially designed and built to make and print at the same operation 120 No. 6 side seam coin trip envelopes a minute for the use of conductors, half of the quantity being printed in red and the other half in black. The two colors are to differentiate between the direction of the trips, e.g., east from west and north from south.

Many of the machines in this shop have special attachments and improvements developed by J. G. Robertson, superintendent of the printing department.

Twenty-eight persons are employed in the department, five of whom are girls, and three-fourths of the working time is spent on general work other than transfer printing. Before the Meisel press was installed it was a common practice for the department to run twenty-three hours a day, but since that time the work is generally confined to a period of nine hours. This is the only department of the company which is not operated by organized labor.

## Welding Engineering Takes on New Dignity

New Association to Be Called the American Welding Society Assumes Concrete Form to Advance the Art of Welding

THE temporary association formed to organize the American Welding Society has issued a call to all engineering associations, scientific societies, governmental departments, manufacturers and others interested in the development of welding, to join in the formation of this society. The first meeting will be held on Friday, Mar. 28, at 10.30 a.m. in the Engineering Societies Building, New York City.

Now that industry is again becoming normal, it is desirable that the advance in welding, which has resulted from war conditions, should be continued and extended to accomplish more important results. The objects of the new society include the bringing together of persons from all branches of the industry who are interested in any type of welding. This society will create and assist in maintaining what may be termed a "Bureau of Welding," which will afford a means for conducting any investigation which may be considered desirable by any of the engineering societies or manufacturers.

Several classes of membership are contemplated. These include companies that manufacture or sell apparatus or supplies for welding or that employ welding as a process in their output, also individual membership of the employees of these companies, consulting engineers, college professors or members of any engineering society.

As a part of its routine the new society will ascertain what specific investigation or assistance is needed in any branch of the welding industry. If this assistance involves research, a definite program will be arranged and presented to the portion of the industry affected, indicating the benefits to be derived therefrom. The funds which will come from the annual dues are intended primarily to maintain the society, and will obviously be sufficient for any extensive research. It is the intention therefore to finance each research separately. Any investigation desired by the industry will be made if sufficient financial support can be secured to conduct it efficiently.

The benefits of a proper standardization both to the producer and to the consumer are well recognized, but as some of the manufacturers interested in the new society have expressed fears that standardization might be carried too far, from the commercial point of view, it seems desirable to provide uniform methods that will secure in each case co-operation and support of all



the organizations whose interest may be affected. Such a method of establishing a standard by this society would not only assure that all interested organizations or groups may participate in the work, but it also requires practically the unanimous consent of the standard before it can be issued. It is intended that the work of the new society in standardization shall conform to the procedure established by the American Engineering Standards Committee, and shall be subject to its approval.

In many localities the application of welding to certain classes of structures is now prohibited by law. When the technical work of the Bureau of Welding has demonstrated that such restrictive measures are no longer necessary, it will be appropriate for the society to take steps to have them modified by supplying authentic information that the law makers will respect. Investigations of the welding committee have thus far shown that one of the most important elements in the success of welding operations lies in the skill of the operator. To secure this uniform method of training is essential, and the society will take an active part in planning how welders should be trained, and how their proficiency may be determined.

## AMERICAN ASSOCIATION NEWS

### Chicago Section Meets

A MEETING of the Chicago Elevated Railroads company section was held Feb. 19, and about seventy-five members were in attendance. E. A. Brion, comptroller, talked on the various issues of Liberty Bonds; J. H. Mallon, safety engineer, and C. B. Scott of the Bureau of Safety, discussed various problems of the safety question, and P. F. McCall, general storekeeper, explained how the store department handled materials.

### Meeting of Felicitation at Manila

AT THE forty-sixth monthly meeting of the "Meralco" section held on Jan. 7, nineteen railway members were elected. Eight were from the accounting department, six from the transportation department and the others from the power plant, claim and medical departments. Retiring President J. M. Bury reviewed the remarkable record of the section with regard to the winning of medals and honorable mention for papers prepared by its members. The new president, C. H. Van Hoven, continued along the same line and closed as follows: "We are going to make this company section a clan, a family group. We want to foster and promote loyalty and closer relations among ourselves. We want to be missionaries in this community that the public may know what we stand for, and that it may know that in our efforts to serve them as they should be served we are also serving ourselves. Meralco has been placed on the electric railway map, and with the aid of every member we are going to keep it there." M. Fariñas and P. Castillo, who had received awards from the American Association, were also presented with checks by the company, and B. H. Blaisdell, chief engineer of power plants, supplemented the medal with a personal check for 100 pesos.

The section itself also awarded the following medals for the best three papers presented during the year:

Gold medal to L. C. Bewsey, carhouse foreman, for his paper on "The Human Element as Applied to Electric Railways"; silver medal to M. T. Borja, watch engineer, for his paper on "Economic Production and Transmission of Electric Power," and bronze medal to I. G. Obligacion, chief clerk transportation department, for his paper on "Menace of the Transfer." Cash prizes were also awarded to conductors and motormen for excellence in the performance of their duties, according to the company's custom.

The following amendment to the by-laws was adopted: "There shall be seven standing committees, consisting of program, entertainment, refreshments, papers, discussions, awards and membership committees, appointed by the executive council immediately after the annual election each year and serving for one year. Special committees may be appointed by the president when authorized by motions passed by the executive council or by the section." The entertainment program at this meeting comprised vocal and instrumental music and a volley ball game played between the employees of the accounting and transportation departments.

### Slogan for Public Service Section

THE new president of company section No. 2, N. W. Bolen has suggested as a slogan for the year the expression "A Full House." The recently elected secretary, A. H. Nelson, has sent a letter to each member asking him to keep the slogan in mind and to assist in making it a fact.

### Western Red Cedar Association Elects New Officers

AT THE fourteenth annual meeting of the Western Red Cedar Association, held at Sandpoint, Idaho, on Feb. 20, R. G. Jones, Lost Creek Cedar Company, was elected president. J. M. Montgomery, Humbird Lumber Company, was chosen as vice-president. Three directors were also elected and committees on advertising, posts, railroads, poles, piling and official inspection were appointed.

The chairman of the 1918 advertising committee stated that \$5,664 had been expended during the year for advertising and the members had displayed more interest than heretofore in this matter. Suggestions were made as to how more vigor could be put into the advertising during the coming year, continuing the advertising of Western red cedar poles for one year more. A committee was appointed to confer with members of the Lifetime Post Association with a view to securing the services of a man competent to inspect poles, piling and posts in the woods, on the landings and in the cedar yards of the members of the Cedar Association with the object of improving the quality of the stock.

A recent bulletin of the United States Labor Department is authority for the statement that appropriations made by Congress to pay the federal government proportion of the cost of state road-building projects now total \$48,500,000, and that an addition of \$200,000,000 probably will be available during the next three years. Then follows a list of approved projects by states, from which it is evident that each state is expected to contribute for the improvement of the highways considerably more than the federal government.



# News of the Electric Railways

FINANCIAL AND CORPORATE • TRAFFIC AND TRANSPORTATION  
PERSONAL MENTION

## New Jersey Men Strike

**Public Service Railway Men Seek to Enforce Recognition of Amalgamated Association**

The employees of the Public Service Railway in Northern New Jersey who are members of the Amalgamated Association went on strike at 4 a. m. on March 12. Service was seriously interrupted, but the company is proceeding with its plans for getting the lines back to normal as soon as possible. Ordinarily the company operates about 1500 cars on the lines affected. Up to noon on the first day more than 300 cars had been placed in service.

### MEN DEMAND UNION RECOGNITION

The principal issue involved is recognition of the union. In a final effort to avert the strike, T. N. McCarter, president of the company, on March 11 conferred with certain employees of the company who were local officers of the Amalgamated Association on the railway. By way of concession he offered three things:

1. To withdraw and abandon forthwith the welfare and collective bargaining plan recently promulgated by the company, which has not received the approval of the men.
2. To submit to the arbitration of the National War Labor Board any question of difference there might be, including the demands of the employees that the company sign a contract recognizing the Amalgamated Union.
3. To submit to the arbitration of the Public Utilities Commission any questions of difference there might be, including the demand of the employees that the company sign a contract recognizing the Amalgamated Union.

The representatives of the Amalgamated Union present declined all of these propositions and declared that the strike must go forward unless the company signed a contract with and formally recognized the Amalgamated Union, none of whose general officers reside in New Jersey or have anything to do with the affairs of the Public Service Railway. This Mr. McCarter declined to do.

### SUBORDINATE DEMANDS

There are twenty-six sections in the demands presented by the men to the company. In addition to recognition of the union, these demands include a system of arbitration of disputes, no discrimination against the union or its members; the men to agree not to discriminate against employees who refuse to join the union; provisions for discipline of workers breaking rules; day's work for all conductors and motormen to be nine hours consecutively, with pay as at present for ten hours; all runs to be straight runs; runs of six hours and less than eight hours to pay nine hours' pay; runs of eight hours and

less than nine hours to pay ten hours' pay; all work in excess of scheduled runs to be considered overtime and to pay time and a half; the company to pay all extra men who answer the roll-call at the rate of \$20 per week, \$5 more than the men are getting now, men on snow sweepers, sand cars and special work to be paid time and a half.

The company is confident that the public will place the responsibility for the strike where it belongs.

Late on March 13 it was announced that officials of the railway would confer in Washington with the War Labor Board in an effort to arrange a settlement of the strike. The representatives of the men were invited. The War Labor Board requested the men to return to work pending a settlement.

## Rotarian Makes His Company Solid

A. W. McLimont, vice-president and general manager of Winnipeg (Man.) Electric Railway, is an enthusiastic Rotarian. When the conference of the Rotary Nineteenth District was held in Winnipeg on Feb. 9, 10 and 11, Mr. McLimont determined to put the Winnipeg Electric Railway organization behind it, and do everything he could to boost rotary and the conference. In this way the company's name was constantly before the public, linked with the rotary idea of service.

A special edition of 20,000 copies of the *Rotary Whizz*, a small publication issued weekly by the Winnipeg Rotary Club, was paid for by Mr. McLimont, and placed in the small box in the street cars, from which the company's own publication is distributed. The only reference to the Winnipeg Electric Railway in the issue of the *Whizz* was in a small panel on the front page.

To draw the attention of the car riders to the fact that the publication was in the box for distribution, a window poster was placed in each car.

Each car also bore a large banner on the fender calling attention to the conference.

Commencing on Feb. 12, immediately after the close of the Rotary Conference was the annual bonspiel of the Manitoba Curlers Association, which lasted two weeks. Further to exemplify the rotary idea of service, Mr. McLimont had window posters printed.

In the special rotary section of the *Winnipeg Free Press*, Mr. McLimont took half a page and published an advertisement.

The part the company took in boosting the rotary idea and the conference was very much appreciated by the Rotary Club of Winnipeg.

## Detroit Purchase Arranged

**Difficulties Overcome in Tentative Agreement With \$31,500,000 as Compromise Price**

The purchase of the properties of the Detroit (Mich.) United Railway within the city by the city has been arranged for at a compromise price of \$31,500,000. All that remains to make the deal binding are some details which the two contending parties were to endeavor to settle at a meeting on March 12.

### AGREEMENT REACHED MARCH 11

The meeting at which the compromise price was agreed upon began at 4 p. m. on March 11 and continued three hours. At the conclusion of the conference Edward T. Fitzgerald, secretary of the Street Railway Commission, gave out the following statement:

The Board of Street Railway Commissioners and the officials of the Detroit United Railway have conditionally agreed upon a price of \$31,500,000. They have not agreed upon important practical details connected therewith. Failure to do so will prevent the submission of the purchase price to the people. The board and the railway officials will meet on March 11, at 10 o'clock for further discussion of the details not yet agreed upon.

The price originally asked by the Detroit United Railway for the properties in question was \$33,500,000. The final and unalterable price offered by the city for the same properties was \$29,653,936. So that the price agreed upon is a straight compromise of about \$2,000,000 by each side.

That a compromise has been effected is also apparent from the language of the letter written on Feb. 22 by the Street Railway Commission to the Detroit United Railway. In this it was said:

It will be useless apparently for us to discuss with you the question of valuation of the property because you advise us that your company unanimously concludes that the price we offered was wholly inadequate. We are firmly of the opinion that the offer we made is entirely fair and adequate.

### BRIEF REVIEW OF NEGOTIATIONS

Things have moved fast in Detroit since James Couzens came into office as Mayor on Jan. 1. A goodly part of his inaugural message was given over to a review of the local railway situation. He promised action at once, looking toward purchase by the city, with a view to having a municipal ownership plan ready to submit to the voters in April. Appointments to the street railway commission, among them that of Edward T. Fitzgerald as secretary, and the retention of M. M. O'Shaughnessy, San Francisco, as special advisor, followed. Detroit then offered the com-



pany \$29,653,936 for the city lines. This was on Feb. 11. On Feb. 18 the company turned this offer down. It suggested as an alternative a price of \$33,500,000 or a lease to the city for a period of fifty years on a rental tentatively fixed at \$2,010,000 per annum

—6 per cent on a valuation of \$33,500,000. This counter leasing proposal the city rejected. The city authorities then announced that they would ask for \$10,000,000 to build municipal lines to compete with the privately-owned ones.

## Seattle Takes Over Its Railway

### Washington State Supreme Court Decision Validates Purchase—Transfer Probable on April 1

When the State Supreme Court at Olympia, Wash., on March 5, handed down a decision sustaining the legality of the \$15,000,000 purchase by the city of Seattle of the railway property of the Puget Sound Traction, Light & Power Company, all legal questions involved in the transaction were cleared away. Seven judges of the Supreme Court favored the purchase, while two judges dissented. It is stated by Thomas F. Murphine, superintendent of public utilities, and A. W. Leonard, president of the railway, that the city may be in possession of the lines by April 1.

#### PREPARED TO TRANSFER PROPERTY

Anticipating a favorable decision in the "friendly" suit, city officials and officials and officers of the company have been preparing for the transfer for weeks, and practically every arrangement has been made, with the exception of minor details, among which is the signing of 15,000 bonds for \$1,000 each by the Mayor and city comptroller.

Under the terms of the purchase contract, the company has forty-five days, following the filing in the trial court of the remittitur from the Supreme Court, in which to deliver its property, free and clear of all encumbrances to the city. In event of failure to make the delivery at the expiration of the time set, the company must pay the city \$400 a day, until the property is so delivered. At the end of six months, the city may continue to collect \$400 a day, or may declare the deal off.

With the transfer of the property, Seattle will acquire 206 miles of track, 540 cars of all kinds, seven carhouses, much valuable real estate, and about \$350,000 worth of materials and supplies. The city payroll will be increased by about 2000 workers, of which 1500 are motormen and conductors. With the exception of the legal department, the maintenance of streets and a few other departments, employees of the private company in all branches of the railway work will be taken into the city service in the same line of work they are now performing.

#### PLANS FOR MUNICIPAL OPERATION

Superintendent of Public Utilities Murphine has made plans for taking over the railway system. It is considered probable that one and possibly both of the present city-owned carhouses will be discontinued, and extensive rerouting of cars will be put into

effect to avoid duplications of service that now exist between the company's lines and those operated by the city. Express service will be installed on as many lines as possible, with no stops between the outlying residence sections and the downtown district.

#### POWER CONTRACT INCLUDED

In the traction deal is a contract which binds the Puget Sound Traction Light & Power Company to sell the city electric current to operate the railway system until such time as the city is prepared to develop its own power, at a price of 1 cent per kilowatt. The current will be delivered to the substations now operated by the Traction Company in connection with railway service.

One of the next steps by the city will be to acquire the lines of the Seattle & Rainier Valley Railway, arrangements for which have been agreed upon, with only details to be taken up.

#### NEGOTIATIONS STARTED LAST SEPTEMBER

Preliminary negotiations for the purchase of the railway system by the city were started on Sept. 6, 1918, in answer to a demand from the United States Shipping Board Emergency Fleet Corporation for better transportation for the shipyard workers. The offer to pay \$15,000,000 in utility bonds was telegraphed to the board of directors of Stone & Webster at Boston, and was accepted one week later. On Sept. 24 the City Council passed the ordinance authorizing the deal. Before the deal was agreed on, the armistice was signed, and the shipyard emergency passed. The transaction was continued as a straight municipal ownership proposition. At the November general election, the deal was submitted to the electors on an advisory ballot, and carried three to one.

#### FRIENDLY TEST SUIT DISMISSED

The Supreme Court's decision sustained dismissal of an injunction proceeding brought by F. A. Twichell and Charles E. Horton, as a "friendly" measure to remove all legal obstacles. They attacked the proposed purchase bond issue, as exceeding the city's charter authority and constitutional limit of municipal indebtedness, also pleading the failure to submit the proposed purchase to an election to validate the indebtedness contracted. The main point in the majority opinion handed down is that a bond issue to be paid

in principal and interest entirely out of the revenues of the utility purchased is not a general indebtedness charged against taxation, and therefore not subject to popular ratification by the voters of the city before the fixed limitation can be exceeded.

On the question of pledging revenues, the majority opinion of the Supreme Court reads:

Appellant contends that because of certain provisions of the ordinances and the statute general indebtedness, transaction may not be consummated without the ratification of the voters. If the completion of the purchase and sale as planned would create a general debt, it would doubtless require the sanction of the voters of the city, otherwise not so.

Our attention is called to certain provisions of the plan or system. Ordinance No. 39025, to the effect that the city, after providing for the special fund, does hereby irrevocably obligate and bind itself to pay into such fund out of the gross revenues of the municipal street railway system sufficient to meet payments of interest and principal of the bonds as they fall due, stating the amounts and maturity of the same, and such fixed amounts out of such gross revenues are hereby pledged to such semi-annual payments of interest and principal, and shall constitute a charge upon such gross revenue superior to all other charges whatsoever, including charges for maintenance and operation; and the obligation of the city in the bonds to pay them with interest, although out of the special fund, even though the balance of gross revenues receipts thereafter remaining may be insufficient to pay the cost of maintaining and operating said system and said additions and betterments thereto.

Judges Chadwick and Mackintosh, who dissented, said in part:

The legal effect of the majority opinion is that all of the gross revenues are pledged to the payment of the purchase price; that if the one who renders labor or service as a motorman, conductor or about the tracks and barns of the railway system is to be paid he may be paid out of the general revenues; that, instead of taking his pay in a warrant which is a first charge upon the gross revenues as the law contemplates, he may not, if the gross revenues are insufficient to meet the maturing bonds and interest, have his pay out of the earnings of the utility at all but must take his chances with a general fund warrant which may be subject to discount and unless sanctioned by subsequent decree of this court will be doubtful validity.

The ordinances but clumsily conceal the reserve purpose of the Council to maintain and operate the street car system at the expense of the general fund, either by a system of loans from the general fund or by levying a direct tax for that purpose.

If the Council did not intend to charge the general fund it might have said so in words. It might have had due regard for the costs of maintenance and operation as the statute directs by reserving an amount or proportion of the revenue of the utility, or being mindful of a possible charge it should have submitted the measure to the people.

The net results of the ordinances as construed by the court is that the cost of maintenance and operation has not been provided for. By the employment of an indirect method dressed for the occasion in a cloak of words the law is circumvented and the people whose rights of participation and self-determination was so carefully safeguarded have been denied the sovereign right of the franchise.

It was suggested in consultation that the Council could raise the rate charged for fare and thus meet the cost of maintenance and operation out of the revenues of the street car system.

Counsel made no such suggestion, as of course they could not, for with the gross revenues of the system pledged irrevocably to the payment of the purchase price the seller or the bondholder, as the case may be, can insist that the gross revenues belong to him whether they are accumulated by a charge of 5, 7, 10 or 50 cents for a single fare.

Believing that the ordinance was drawn with intent to, or whether with intent, it does in legal effect, charge the general fund or leave the way open to levy a direct tax, thus violating the spirit of the law we are constrained to dissent.



## State Regulation Stands

Chicago "Home Rule" Element, Lacking Support of Other Cities, Fails in Attack on Commission

Opponents of state regulation in Illinois failed in an effort to kill the state public utilities act in a hearing before the Senate committee on March 4. Accordingly they have decided to direct their efforts toward safeguarding the contractual relations already existing as the result of franchises granted to public utility companies by various municipalities. There is already pending in the Legislature a bill which would prevent the state commission from interfering with rates established by franchise.

Agitation for repeal of the utilities act has been under way for some time in Illinois. This law has been opposed by the "home rule" element in Chicago ever since it became effective, but until recently it had the united support of the other cities in the State. Developments of the past year, such as the granting of higher rates in certain cities, added to the opposition, and there has been considerable activity during the current session of the Legislature.

An interesting situation has developed in Chicago where it was recently announced that the management of the Chicago Surface Lines had dismissed its appeal attacking the jurisdiction of the state commission over service matters. The city of Chicago also was a party to this appeal, and its special counsel has announced that the city will not let up in its fight to do away with state control over service even though the local companies are willing to be governed by the commission.

## Right to Organize Upheld

The War Labor Board on March 6 handed down a decision upholding the contention of the employees of the Brooklyn Rapid Transit Company that they have the right to organize and bargain collectively with their employers through chosen representatives. The demand was submitted to the War Labor Board by Paul Millman, representing the motormen, who complained of "insufficient wages, hours, general poor working conditions, discriminations and discharges for joining an organization."

The evidence submitted at the hearing dealt almost entirely with the question of discrimination and the refusal of the company to permit the employees to join the Amalgamated Association and it was to this question that the board directed its attention in the finding. The recommendations follow:

It appears from the evidence, uncontroverted by the company, that the officials of the Brooklyn Rapid Transit Company and the operating companies owned and operated by it are violating the policy of the National War Labor Board in not permitting their employees to join the Amalgamated Association of Street & Electric Railway Employees of America. Under the principles of the President's proclamation creating the National War Labor Board and under the rules of the board all of the employees of this company and its subsidiary companies should be free to organize and to join such unions as they choose.

If these employees follow a lawful course toward the company, advised or directed by the national or international union, it is their right, and the company should not prevent them from so doing. Discharges for legitimate union activities, interrogation of workers by officials of the companies as to union affiliations, espionage by agents of the company and like actions, the intent of which is to discourage and prevent men from exercising this right of organization, must be deemed an interference with their rights as laid down in the principles of the board.

We recommend, therefore, that the Brooklyn Rapid Transit Company and its subsidiary companies operating electric railway lines in New York City give full and free permission to the employees to organize into labor unions in conformity with the announced principles of this board and as a matter of plain right and justice.

The finding was signed by Basil M. Manly and F. H. Judson, acting as joint chairman and section chairman.

The company has not issued any statement with respect to the decision.

## Indeterminate Franchise Proposal

The committee on general legislation of the House of Representatives of Minnesota has before it a bill introduced by C. H. Warner, Aitkin, providing for granting of state franchises to electric railways after the surrender of local franchises. The bill would put electric railways under a state franchise, subject to the rule of the State Railroad & Warehouse Commission.

Under the provisions of the bill electric railways would have the right of appeal from any municipal regulation as to fares and service, first to the state commission and then to the courts. The bill would give municipalities the right to purchase electric railways, but the price fixed would be made subject to review by the state commission.

An electric railway would receive a state franchise by filing, before the expiration of its local franchise, permit or license, a written declaration with the Secretary of State and the clerk of the municipality where the franchise, permit or license was granted, to the effect that it surrenders its local franchise.

## United States Employment Service Broadened

The United States Employment Service has further extended the scope of its work by the establishment of two new zone offices of the professional and special section, in Philadelphia and Boston, and it plans to establish other offices of this section in the near future. The new zone offices are in addition to the two main offices at New York and Chicago. They will serve the particular zones in which they are located. The main offices of the professional section are daily receiving the lieutenants, captains, majors and even colonels who led their men to victory, and without exception these men ask for but one thing—opportunity to win new successes in the business world. They are men of proved tenacity, of the quickest intelligence, hundreds of them experienced in executive, professional and technical work.

Employers, representing every line of special endeavor in the industrial world, have been quick to recognize the opportunity to obtain high grade men, and equally quick to forward their requirements to the professional section. Those requiring the services of such men are asked to state definitely the nature of the positions available, to the nearest of the following United States Employment Service, Professional and Special Section offices:

New York office, 16 East Forty-Second Street; Chicago, 62 East Adams Street; Philadelphia, 1518 Walnut Street; Boston, 16 Tremont Street.

## Five Cents More For Kansas City Men

The Kansas City (Mo.) Railways on Feb. 26 announced an increase in pay for trainmen of 5 cents an hour, and a discontinuance of the strike bonus, effective March 1.

The new wage scale, together with the present scale, is announced as follows:

	New Hr. Wage, Cents	Pres. Hr. Wage, Cents
Length of service:		
First six months.....	35	30
Next six months.....	36	31
Second year .....	37	32
Third year .....	38	33
Fourth year .....	39	34
Fifth year and over.....	40	35

One-man car service 2½ cents an hour over scale.

One additional hour a day allowed for training students.

Minimum monthly wage for extra trainmen, \$75. It formerly was \$60.

Uniforms as part of the wages are abolished and the amount formerly spent for them added to the wage scale.

The company announced that trainmen who did not strike on Dec. 11 would become members of a "Uniform Club" and receive uniforms without charge, based on years in the service. Men who had worked for the company more than a year were given one uniform a year free, and men in the service more than five years were given two uniforms a year. Men who struck on Dec. 11, but returned to the service before Jan. 31, may be added to this club upon approval of the superintendent of transportation, it was announced. Philip J. Kealy, president of the company, is quoted as follows:

Our purpose in fixing this new scale is to build up a permanent staff of employees. Everyone knew that the bonus was temporary.

These changes in the wage scale are made possible by the fact that practically the entire transportation force is made up of first year men, drawing the minimum hourly rate.

For these reasons this average 5 cents an hour increase is possible, with but a slight increase in the present total transportation payroll.

Under the new schedule the average daily wage for trainmen will be \$3.65, as the men work an average of 10.4 hours a day. Everyone knows that the present minimum salary, without the bonus, is not a sufficient wage. Because 50 per cent of our old employees were maximum wage men and 90 per cent of our present employees are minimum wage men we are able to make this increase.

We no longer will furnish uniforms except to members of the Uniform Club. This amounted to about 2 cents an hour in pay. All former service men who want their jobs back now must start in at the minimum wage. Under the new schedule, those who formerly were getting the maximum wage can return at a wage 3 cents an hour less than they formerly were getting.



## News Notes

**Additional Power for Ohio Commission.**—Representative Miller has introduced a bill in the House of Representatives of Ohio which will give the Public Utilities Commission authority to order the abandonment of public utilities in case sufficient cause for doing so is shown.

**An Income Tax Reminder.**—The Tri-City Railway, Davenport, Ia., included in a recent pay envelope a statement of the income of each individual for the year 1918 with a reminder as to the conditions under which the individual will be required to make a return to the Government.

**Would Isolate Motormen.**—Representative A. O. Hauge, of Polk County, member of the Legislature of Iowa, has proposed a bill in the House which would compel electric railways operating in that State to provide inclosed compartments for all motormen. The bill required that the compartment must be sound proof.

**Progress on City Ownership Bill.**—The electric railway ownership bill authorizing cities to purchase the railways has passed the House of Representatives of Kansas and it is expected to pass the Senate. An effort has been made to tack on a rider prohibiting Kansas owning the transportation system unless Missouri does likewise.

**Recent Railway Measures in Iowa.**—Two measures in which the electric railways of Iowa are interested were introduced recently in the House of Representatives of the Iowa Legislature by representative Epps of Wapello County. One bill would prevent the operation of one-man cars and the other would require power brakes on all cars more than 30 ft. in length.

**Wants Norwalk Franchise Renewed.**—The Lake Shore Electric, Railway, Cleveland, Ohio, has submitted a twenty-five-year franchise to the City Council of Norwalk, Ohio, for consideration. The terms are about the same as those contained in a franchise submitted a year ago. F. W. Coen, general manager of the company, told Council that in the last fourteen or fifteen years the cost of operation has increased from 14½ cents to 85 cents per mile.

**Mr. Ford Threatens Competition.**—Henry Ford is a big asset as newspaper copy. Accordingly much space has been given lately by the daily press to plans which he and his son are said to have in mind for establishing factories to make a new auto to sell at \$250 to \$350. Mr. Ford would make of this car "a competitor of the street car, rather than of the Ford." He is reported to have said that the new car would be

for the use of people who have no urgent need for a motor car except to go to and from work, or for infrequent pleasure trips.

**Recommends Free Right to Organize.**—The National War Labor Board has decided in favor of the men in questions involving the workers and the Union Railway and the Third Avenue Railway, New York, N. Y. The board said: "We recommend that the Union Railway give full and free permission to its employees to organize into labor unions, in conformity with the announced principles of this board and of the proclamation of the President, under which the board was created." The complaint of the employees of the Third Avenue Railway was similar to that of the Union Company employees and the findings were identical.

**Stimulate Business by Advertising.**—At the conference of officials of the government, Governors of the States and Mayors of large cities in Washington on March 3, 4 and 5, a nation wide publicity campaign to stimulate business was proposed by Roger Babson, chief of the bureau of information and education of the Department of Labor. He declared that the same direct interest which encouraged people of the country to save in time of war should actuate them to spend during the period of reconstruction, and that the necessity for immediate resumption of business could best be brought to the attention of the nation through extensive advertising.

**Municipal Line Would Put Profits First.**—City Engineer O'Shaughnessy of San Francisco, Cal., who has been advising Mayor Couzens of Detroit, Mich., on street railway matters, has returned to San Francisco and is backing up Fred Boeken, superintendent of the San Francisco Municipal Railway, in opposing the Parkside extension of the San Francisco municipal lines. Mr. O'Shaughnessy thinks an extension there would represent a loss of \$32,000 to \$48,000 annually. While this subject was being discussed it was brought out that the auto buses now handling traffic across Golden Gate Park may be continued even though operating at a loss. They provide a necessary service at a loss much less than would be entailed were the same service provided by means of an electric railway.

**Must Have Help in Paducah.**—A. S. Nichols, manager of the Paducah Traction & Light Company, Paducah, Ky., appeared before the City Commissioners on March 6, and stated that the city would have to take over and operate the railway or grant a more liberal franchise. He said that the organization had been losing money for ten years, and that under the conditions that obtain at present in Paducah it was absolutely impossible to operate the railway so as to return a profit. The company would be glad to sell to the city at a reasonable price for plant and equipment, said Mr. Nichols. In the event that the city was not interested in purchasing,

a broader franchise should be granted. This would enable the company to interest outside capital. The Commissioners took the matter under advisement.

**Reviews Spokane Franchise Provisions.**—In response to a request from the City Council of Spokane, Wash., J. M. Geraghty, the corporation counsel, has reviewed the franchise provisions of the city charter in detail with reference to their application to railway franchises. He finds that no new franchise can be issued earlier than three years prior to the expiration of an existing franchise. Mr. Geraghty finds that all of the Spokane Traction Company's franchises have more than three years to run. This is also true of many of the franchises of the Washington Water Power Company. The city charter gives the right of referendum on all franchises except as otherwise provided by law. The Supreme Court, however, has held that an electric railway franchise is not subject to referendum. According to Mr. Geraghty the two Spokane railway companies cannot consolidate or receive a new franchise from the city without the city charter being amended.

## Programs of Meetings

### Southwestern Electrical & Gas Association

The fifteenth annual convention of the Southwestern Electrical & Gas Association will be held at Galveston, Tex., on May 12, 13 and 14 at the Hotel Galvey.

### Wisconsin Electrical Association

The program of the eleventh annual convention of the Wisconsin Electrical Association to be held at the Hotel Pfister, Milwaukee, Wis., on Mar. 26 and 27 will include the following papers:

"Comments on Overhead Distribution," Frank A. Robbins, Superior Light, Water & Power Company, Superior, Wis.

"High Tension Out-Door Substations and Switching Equipment," Alfred Alfaker, consulting engineer, Chicago.

"Safety Cars," H. L. Andrew, General Electric Company, Schenectady, N. Y.

"Public Utilities Services to Industries," N. J. Whelan, Wisconsin-Minnesota Light & Power Company, Eau Claire, Wis.

"A Review of Policies of Service Extensions as Laid Down by State Commissions," A. J. Goodjen, statistician, Wisconsin Public Service Company, Milwaukee.

The program for the joint meeting with the Wisconsin Gas Association on March 26 is not yet complete, but will include an address by Chester Corey, vice-president of the Harris Trust & Savings Bank, Chicago, Ill., on "Public Utilities Securities," also an address by John S. Allen of the Railroad Commission of Wisconsin.



# Financial and Corporate

## 1918 a Year of Deficits

**Pittsburgh and San Francisco Subsidiaries of United Railways Investment Company Suffered Heavy Losses**

The latest fiscal year was one of decided loss for the operating electric railway subsidiaries of the United Railways Investment Company. In Pittsburgh, Pa., the net income of \$362,446 for 1917 was changed into a deficit of \$467,665 for 1918, and in San Francisco, Cal., the net income of \$263,479 in 1917 fell to a deficit of \$1,677,691 for 1918.

The United Railways Investment Company, it will be recalled, is solely a holding company, having interests in two widely separated fields. Its interests in the Pittsburgh district are represented by holding of stock in the Philadelphia Company, which controls the Pittsburgh Railways and other utilities. Its properties in California are held

through ownership of stock in the California Railway & Power Company, which in turn controls the United Railroads of San Francisco and lighting companies.

The consolidated income statement of the Pittsburgh Railways and its allied lines for the latest fiscal year, which closed on March 31, 1918, is presented herewith. The maximum of industrial activity in this district was reached in the spring of 1917. The gradual growth in traffic during the previous year continued until July, 1917, when the largest month's traffic in the history of the company occurred. After this time there was a monthly decrease. The departure of men through enlistment and the draft for service with the government and the attraction of high wages on government work elsewhere for mechanics and laborers resulted in a curtailment of general business that was reflected in reduced traffic.

The high labor costs and the uncertainties regarding necessary materials and supplies caused a gradual increase in operating expenses, the operating ratio, excluding taxes, increasing from 64.1 per cent for 1917 to 73.41 per cent for 1918; and, including taxes, from 67.97 per cent for the previous year to 77.7 per cent for the last year.

The gross earnings of the Pittsburgh Railways proper for the year ended March 31, 1918, were \$13,421,934, an increase of but \$66,962 over the previous year. The operating expenses were \$9,855,009, an increase of \$1,307,602. Taxes rose \$57,923, and the cost of power increased \$490,156 owing primarily to the unprecedented prices of coal.

### \$540,388 FOR IMPROVEMENTS

There was expended during the year \$540,398 for improvements, betterments and extensions on the properties operated by the Pittsburgh Railways. Of this \$359,487 was charged to capital account and \$180,910 was charged to a deferred account, owing to extraordinary expenditures for improvements, replacements and realignments. There was charged to income account \$91,277 as amortization of the deferred account for the same class of work.

The deficit of the combined lines in Pittsburgh for the year ended March 31, 1918, after all charges, was \$570,533. This more than equaled the surplus at the beginning of the year, so that on March 31, 1918, there was a deficit of \$68,972 to be carried forward.

The income statement of the United Railroads of San Francisco, also published herewith, is for the fiscal years ended June 30, 1917 and 1918. The decline of this company during the last year is evident without extended description, the falling off of \$1,196,247 in passenger revenue and the increase of \$808,122 in operating expenses casting a terrific burden upon the company. The decrease in net income is said to have been due principally to the lesser receipts occasioned by a strike and the heavy expenditures incidental thereto.

Profit and loss charges for last year totaled \$598,050, of which \$550,000 was for depreciation. The surplus of \$992,091 at the beginning of the year was reduced to a deficit of \$1,269,368 on June 30, 1918. During the last year the additions and betterments to property cost \$225,953, while sales and property removed involved \$107,196.

### Passenger Traffic Decreased

The Carolina Light & Power Company, which supplies electric railway service in Raleigh, N. C., carried 2,362,428 passengers during the calendar year 1918, as compared to 2,411,319 for the preceding year. The electric railway earnings amounted to \$108,740, or approximately 10 per cent of the total earnings from operation. The allied Asheville Power & Light Company also showed a decrease in passenger traffic from 5,566,567 in 1917 to 5,519,038 in 1918. The electric railway revenues of this company amounted to \$267,906 or 50 per cent of the total.

CONSOLIDATED INCOME STATEMENT OF PITTSBURGH RAILWAYS FOR YEARS ENDED MARCH 31, 1917 AND 1918

	1918		1917	
	Amount	Per Cent	Amount	Per Cent
Gross revenue from railway operation.....	\$13,726,741	100.0	\$13,648,579	100.0
Operating expenses and taxes:				
Maintenance of way and structures.....	\$1,184,094	8.6	\$1,141,119	8.4
Maintenance of equipment.....	1,288,869	9.4	826,687	6.1
Traffic.....	41,854	0.3	31,656	0.2
Power.....	2,083,981	15.2	1,552,410	11.4
Transportation.....	3,907,432	28.5	3,681,353	26.9
General and miscellaneous.....	1,589,660	11.5	1,524,523	11.2
Total.....	\$10,095,890	73.5	\$8,757,748	64.2
Taxes.....	581,653	4.2	524,484	3.8
Total.....	\$10,677,543	77.7	\$9,282,233	68.0
Income from railway operation.....	\$3,049,198	22.3	\$4,366,346	32.0
Income from auxiliary operations.....	44,866	0.3	74,268	0.5
Total operating income.....	\$3,094,064	22.6	\$4,440,614	32.5
Other income.....	128,989	0.9	172,326	1.3
Gross income.....	\$3,223,053	23.5	\$4,612,940	33.8
Rentals and interest.....	3,690,718	26.9	4,250,494	31.1
Net income.....	†\$467,665	3.4	\$362,446	2.7
† Deficit.				

INCOME STATEMENT OF UNITED RAILROADS OF SAN FRANCISCO FOR YEARS ENDED JUNE 30, 1917 AND 1918

	1918		1917	
	Amount	Per Cent	Amount	Per Cent
Passenger revenue.....	\$6,203,164	99.1	\$7,399,411	99.2
Other operating revenue.....	58,835	0.9	58,730	0.8
Total operating revenues.....	\$6,261,999	100.0	\$7,458,141	100.0
Maintenance of way and structures.....	\$286,642	4.6	\$418,983	5.6
Maintenance of equipment.....	346,703	5.5	379,696	5.1
Transportation.....	3,786,404	60.5	3,292,903	44.1
General.....	1,178,255	18.8	672,719	9.0
Total operating expenses.....	\$5,572,423	89.0	\$4,764,301	63.8
Taxes.....	434,400	6.9	487,900	6.6
Total operating expenses and taxes.....	\$6,006,823	95.9	\$5,252,201	70.4
Operating income.....	\$255,176	4.1	\$2,205,940	29.6
Other income.....	170,409	2.7	163,121	2.2
Gross income.....	\$425,585	6.8	\$2,369,061	31.8
Income charges.....	511,413	8.2	511,218	6.9
Income before deducting bond interest.....	†\$85,828	1.4	\$1,857,843	24.9
Bond interest.....	1,591,863	25.4	1,594,364	21.4
Net income.....	†\$1,677,691	26.8	\$263,479	3.5

\* Less \$25,581 for transportation for investment.

† Deficit.



## Bay State to Be Reorganized

**Plan Provides for \$3,582,633 of New Cash from Stockholders and Scaling Down \$20,000,000 of Capitalization to Conform to Public Control Act**

The plan of reorganization for the Bay State Street Railway and Massachusetts Electric Companies has been completed. It provides for raising \$6,082,633 of cash; places the capitalization of the new company at approximately \$52,396,950 and annual interest and dividend requirements at \$2,760,000, and provides for cash payments of \$3,582,633 by the sale of new securities to stockholders who subscribe.

reduction of more than \$20,000,000 from the outstanding debt and capital stocks of the Bay State and Massachusetts Electric companies.

The new company is entitled to earn 1.88 times the fixed charges under the reorganization plan. A further safeguard is that the compulsory cash requirements for fixed charges are made exceedingly small during the first two years of operation. A condensed

### APPROXIMATE CAPITALIZATION OF NEW BAY STATE COMPANY

	Amount	Annual Return
Underlying bonds and undisturbed securities.....	\$8,053,700	\$439.64
New refunding mortgage 6 per cent one-ten year serial bonds.....	2,500,000	150.00
Total securities on which fixed charges must be paid in cash from the beginning.....	\$10,553,700	\$589.645
New refunding mortgage bonds with security under the same mortgage as the one ten-year serial 6s, above mentioned, but with the provision that in the event of "available income" being insufficient, interest accruing prior to June 30, 1921, may be postponed to not later than Dec. 31, 1925:		
5 per cent bonds, due 1948.....	2,871,000	143.550
4 1/2 per cent bonds, due 1948.....	14,956,000	673.020
6 per cent bonds, due 1927.....	972,000	58.320
Total securities bearing fixed charges.....	\$29,352,700	\$1,464.535
New first preferred stock and sinking-fund stock, 6 per cent cumulative.....	4,097,000	245.820
New preferred B stock, 6 per cent cumulative.....	2,998,500	179.910
New adjustment stock, 5 per cent cumulative.....	8,719,000	435.950
New common stock, 6 per cent (approximate).....	7,229,750	433.785
Total capitalization (approximate).....	\$52,396,950	\$2,760.000

The plan of reorganization, when put into effect, will permit the acceptance of the special legislative act of 1918 and the formation of the new Eastern Massachusetts Street Railway under public trustees. The trustees, it will be recalled, will have absolute power to fix fares sufficient to pay a return covering all interest requirements, the stated dividends on the preferred stocks and 6 per cent on the common stock of the new company. Based upon the Public Service Commission's appraisal of \$40,282,340 in its decision of Aug. 31, 1916, plus subsequent additions, the property valuation will be about \$46,000,000, on which \$2,760,000 is the approximate amount of the permitted initial annual return.

The credit of the State is pledged for the payment of the principal of not exceeding \$4,000,000 of serial mortgage bonds of the new company maturing within ten years from the date of issuance. The act requires that \$2,500,000 of these bonds be sold immediately so as to produce \$2,500,000 cash, of which \$2,000,000 must be used for future additions and improvements and \$500,000 set aside as a reserve fund; and that \$1,000,000 of cash additional must be realized from sale of other securities of the new company and applied to the rehabilitation of the properties or other corporate purposes. This makes a total of \$3,500,000 of new cash which must be obtained, as a prerequisite to the formation of the new company under the act.

The proposed capitalization of the new company conforms to the act, so that the permitted return will always be sufficient to pay all fixed charges and regular dividends. It represents a

approximate statement of the capitalization of the new company is given in the table above.

The amounts of new securities to be received by subscribing shareholders (per share) are as follows:

	For Each Share of Bay State Preferred Upon Payment of \$15	For Each Share of Massachusetts Electric Preferred Upon Payment of \$10	For Each Share of Massachusetts Electric Common Upon Payment of \$5
New refunding mortgage 5s.....	\$15	\$10	...
New first preferred stock, 6 per cent.....	...	...	\$6
New preferred B stock, 6 per cent.....	100	...	...
New adjustment stock, 5 per cent.....	12	2	...
New common stock.....	...	24*	10
Total par value, exclusive of option warrants.....	\$127	\$36*	\$16
†Option warrants for adjustment stock at par.....	...	\$25	\$10

\* Estimated.

† The option warrants give the right to purchase new 5 per cent cumulative adjustment stock (par value \$100) at \$36 per share during the first year, \$38 per share during the second year and \$40 per share during the third year after reorganization, subject in each case to an interest and dividend adjustment.

Lee, Higginson & Company, Boston, New York and Chicago, have underwritten the purchase of \$2,500,000 of serial bonds and \$1,000,000 of the cash subscriptions offered to stockholders. There will, however, be no commitment by the underwriters until at least \$2,000,000 of the above-mentioned \$3,582,633 cash has been subscribed by the present shareholders. If the shareholders subscribe less than \$2,000,000, the reorganization plan will fail.

Lee, Higginson & Company are offering temporary negotiable receipts for the refunding mortgage one ten-year serial 6 per cent bonds at 100 and interest. The bonds will be in coupon form for \$1,000, registerable as to principal only. They will be callable at 105 on any interest date on sixty days' notice.

## Rhode Island Deficit Increases

The annual statement of earnings of the Rhode Island Company, Providence, R. I., just filed with the Public Utilities Commission, shows a net deficit of \$777,523 for 1918. This is about \$265,000 larger than the deficit for 1917.

The total operating revenue for 1918 was \$6,311,285, which is \$310,682 or slightly more than 5 per cent more than in 1917. Operating expenses totaled \$5,115,551, an increase of approximately \$600,000 or 13.2 per cent. The net operating revenue for 1918 was \$1,195,734.

Deductions totaled \$2,084,591, more than half of which represented rental charges. Taxes showed an increase of 7.78 per cent or \$51,000, totaling \$604,249. Interest and discounts registered a 9 per cent advance, aggregating \$316,501.

A detailed report of operations for December, which was filed with the annual statement, showed an increase of \$78,371 or practically 17 per cent over December, 1917. The total passenger earnings for December, 1918, reached \$541,590.

The company's policy in discontinuing non-paying lines in order to reduce as far as possible the deficit is reflected in the December statement. This shows a decrease of approximately 150,000 car-miles, the total mileage for the month being 1,194,663 against 1,347,055 in 1917. The receipts per car-mile increased from 34.39 cents in December, 1917, to 45.33 cents in December, 1918.

## Want Tax Rate Reduced

Representatives of electric railways in San Francisco, Los Angeles, Oakland and other cities of California have petitioned the State Board of Equalization for a reduction in tax rate on gross earnings. To support the plea, the California Electric Railway Association promised the board to present figures showing a tremendous loss in earnings due to increased cost of labor and materials. It is intended to show that unless a reduction in taxation is granted by the State the railroads will be forced to raise fares. Taxes collected from railroads, including electric railways, amount to \$7,982,910 for the present fiscal year. Of this amount the Southern Pacific, Santa Fe, Salt Lake, Northwestern Pacific and Western Pacific pay \$5,995,572. This leaves a balance of \$1,987,337, which is paid by the non-government railroads and electric railways of the State. The rate of taxation is 5 1/2 per cent of the gross earnings.



## Protective Committees for New York Surface Lines

It was announced on March 8 that because of financial problems confronting the New York (N. Y.) Railways, committees had been appointed to represent the holders of both the real estate and refunding 4 per cent bonds and the adjustment 5 per cent bonds.

Harry Bronner is chairman of the first committee and the other members are William A. Day, Casper W. Morris, Charles A. Peabody, W. H. Remick, Frederick H. Shipman, and Harold Stanley. F. J. Frost is secretary and J. P. Cotton counsel. This committee said that its members already represented directly \$4,000,000 of the bonds. Holders of the bonds have been invited to deposit them with the Guaranty Trust Company, New York, N. Y., under a deposit agreement.

The committee of the income bondholders are John Candler Cobb, chairman; Oscar Cooper, Haley Fiske, Frank L. Hall, Duncan A. Holmes, Ernest Stauffren, Jr., and Richard H. Swartwout. B. W. Jones is secretary and Murray, Prentice & Howland are the counsel. Holders of these bonds have been invited to deposit them with the Bankers' Trust Company, New York, N. Y., the Old Colony Trust Company, Boston, and the Commercial Trust Company, Philadelphia. The deposit agreement is being prepared.

## Aurora, Elgin & Chicago Protective Committee

A protective committee has been formed to represent holders of Aurora, Elgin & Chicago Railroad first and refunding mortgage 5 per cent bonds, due 1946, and three-year collateral trust notes, due 1921, secured by the first and refunding mortgage bonds.

The committee comprises R. M. Stinson, chairman, of R. M. Stinson & Company, Philadelphia; George H. Stuart, 3d, treasurer, Girard Trust Company; Lewis B. Williams, of Hayden, Miller & Company, Cleveland; W. T. Goodale, Saco & Biddeford Savings Institution, Saco, Me., and A. B. Conant, of A. B. Conant & Company, Boston.

The Girard Trust Company, Philadelphia, Pa., is depository and the International Trust Company, Boston, and the Citizens' Savings & Trust Company, Cleveland, are subdepositories. Deposits of securities are to be made before March 31.

On Jan. 1, 1919, default was made in the payment of the interest due on the first and refunding mortgage 5 per cent bonds, \$3,079,000 par value of which are outstanding in the hands of the public and \$1,626,000 par value of which are deposited as collateral security for the three-year collateral trust notes, of which there are \$1,219,000 outstanding. The company has notified holders of these three-year notes that the interest due on same on March 1 will not be paid.

On Dec. 1, 1918, default was made in the payment of the interest due on

\$1,546,000 par value of Elgin, Aurora & Southern Traction Company first mortgage bonds, which interest must be met before June 1, 1919, or the holders of the Elgin, Aurora & Southern Traction Company bonds will have the right to compel the foreclosure of the mortgage securing same.

## Receivers' Powers Defined

Presiding Justice Tanner of the Rhode Island Superior Court has approved the decree defining the powers of the three permanent receivers appointed for the Rhode Island Company, Providence, R. I., on March 4.

Specific reference is made as to the payment of wages, salaries, etc., the receivers being authorized to pay, subject to the order of the court, any such claims as have been incurred within six months past and now unpaid. As the payment of back wages to employees of the company has not yet been settled, this clause it is believed will govern the future disposition of these claims, although this matter was not specifically referred to at the hearing.

As to the surrender or continuance of any of the leases, or contracts now vested in or belonging to the Rhode Island Company, the court reserves the right hereafter to direct the receivers to surrender, reject or adopt any such leases or contracts.

Presiding Justice Tanner read the decree that had been drawn by the attorneys and called attention to the provisions of the ninth paragraph in relation to making various payments, including salaries. He said that such a payment must follow the statutes and that the priority rule therein contained must be observed. The court reminded counsel that although wages accruing during the six months next preceding the adjudication of insolvency to the extent of \$100 in any case are regarded as a preferred claim, they are not necessarily a first preferred claim under the statutes.

Upon the entry of the decree by the court, Eugene A. Kingman of Edwards & Angell, asked leave to file an intervening petition in behalf of leased lines requiring the receivers to elect as soon as possible whether they will adopt the leases under which the roads have been operated by the Rhode Island Company.

The court granted permission to file the intervening petition and assigned it for hearing on April 2. The petition also asks that the receivers shall pay all the back rent that accrued under the leases prior to the appointment of the receivers. The petitioners ask specifically:

That the receivers pay all rentals accruing under said leases prior to the date of appointment of said receivers and in accordance with other terms of said leases and

That the receivers be directed by this honorable court to apply for leave to adopt all of said leases in their entirety and

That failing such election your petitioners be declared entitled to resume and take possession of all the demised premises and property and

That your petitioners may have such other and further relief in the premises as to your honor shall seem meet.

## Financial News Notes

**Car Trust Certificates in Trenton.**—The Board of Public Utility Commissioners has authorized the Trenton & Mercer County Traction Corporation to issue \$121,000 of 6 per cent car trust certificates in part payment for twenty one-man safety cars.

**If You Have a Claim, File It.**—All creditors of the Fort Wayne & Northern Indiana Traction Company, Fort Wayne, Ind., and all parties having or holding any claim of any kind against the company, or its property or franchises, are ordered to file their itemized and verified claims with the receiver on or before April 10, 1919.

**Wants to Extend Its Bonds.**—Unable to finance payment at maturity on April 1 of the \$2,000,000 of its first mortgage twenty-year gold bonds, the Denver (Col.) Tramway offers to holders to extend the securities for five years. The bonds will be subject to redemption at 102½ on any interest date on thirty days' notice. Interest at 6 per cent a year will be paid.

**Abandonment Case Put Over.**—An application on behalf of the Huntington (N. Y.) Railroad to discontinue the system came up before Public Service Commissioner Fennell on March 10. As there is a petition before the Supreme Court to dissolve the corporation Commissioner Fennell said that he would await the court's action in the matter. Meanwhile the road will be operated as usual. According to the company, the road was operated at a loss of \$55,000 for 1918.

**No Action on the Common Dividend.**—According to W. W. Lanahan & Company, Baltimore, Md., no action has been taken on the common stock dividend of the Monongahela Valley Traction Company, Fairmont, W. Va., and probably none will be taken until conditions justify such action. Lanahan & Company say that this seems wise under the circumstances, "for traction companies generally have been having an unusually hard time of it during these days of high prices and increased labor costs."

**Inactive Company Dissolved.**—The East St. Louis & St. Louis Traction Company, which was formed by officials of the East St. Louis & Suburban Railway, East St. Louis, Ill., to operate cars on the free bridge, has returned its charter to the Secretary of State of Illinois and dissolved. The charter allowed the company to operate cars on the free bridge if the consent of the city of St. Louis was obtained. The consent was never sought and inasmuch as St. Louis proposes to operate on the bridge, the East St. Louis & St. Louis Traction Company decided to dissolve.



**Junking of Entire Line Threatened.**—The entire Spokane & Inland Empire Railway, with the possible exception of the Coeur d'Alene division, may be junked unless the people of Spokane give the company their whole-hearted financial and moral support. Waldo G. Paine, vice-president of the company, said recently that the two city lines of the company might be abandoned if the merger of the lines in Spokane failed. Fred E. Connors, receiver of the company, has added that the whole of the company's property might be torn up in order to prevent further loss to the bondholders.

**Alleged Default by Philadelphia Railways.**—A suit in equity was filed on March 11 in Common Pleas Court by the Real Estate Title Insurance & Trust Company against the Philadelphia (Pa.) Railways alleging that default has been made in a three months' payment on a \$400,000 issue of 5 per cent bonds. The trust company asks the court to sell the property in order to pay the overdue interest. The United States Shipping Board, Emergency Fleet Corporation, is also named as defendant, having operated the line for the transportation of workmen to Hog Island since 1918.

**Union Traction Expenses High.**—The revenue of the Union Traction Company of Indiana for the year 1918 was \$3,198,820 as compared to \$3,066,466 for 1917, an increase of \$132,354 or 4.32 per cent. The operating expenses for 1918 were \$2,236,487 as compared to \$2,023,609 for 1917, an increase of \$212,877 or 10.32 per cent. The result for 1918 was a deficit of \$34,966, without deduction of sinking-fund payments, a decrease of \$77,138 from the net income of \$42,141 in 1917. After the deduction of sinking-fund charges the deficit was \$98,542 as compared with a deficit of \$17,649 in 1917, a loss of \$80,893.

**Winnipeg More Hopeful.**—The gross earnings of the Winnipeg (Man.) Electric Railway for the calendar year 1918 at \$3,588,723 showed a gain of \$249,713 as compared to those of the preceding year. The increased wages and other operating expenses, however, swelled the operating charges so that the net income of \$289,784 (excluding depreciation) represented a falling off of \$63,845. The year 1918 was one of difficulty on account of the influenza epidemic and a sympathetic strike with the city fire brigade. On the other hand, jitney competition was eliminated. The outlook is said to be much brighter than for a number of years past.

**Bills in Equity in B. R. T. Case.**—Two bills in equity have been filed in the United States District Court to protect the formal rights of the Central Union Trust Company, New York, N. Y., as trustee under two mortgages of the Brooklyn Rapid Transit Company in pursuance of orders granted a few days ago by Judge Julius M. Mayer. In one instance the issue was of \$60,000,000 of long term bonds issued by the New York Municipal Railway Cor-

poration and in the other \$29,000,000 of 6 per cent ten-year bonds dated June 1 last issued by the Brooklyn Rapid Transit Company. In each case the terms of the mortgage provided that the establishment of a receivership should be accounted a cause for foreclosure. It is probable, however, that the two bills may be regarded as of a formal character designed chiefly to protect the rights of the trust company.

#### Beneficial Results Likely to Follow.

—Francis T. Homer, president of the American Cities Company, New York, N. Y., in a statement to banking houses, which have distributed securities of the New Orleans Railway Light Company, said: "The appointment of a receiver for the New Orleans Railway & Light Company should ultimately be beneficial to all security holders. The receiver, with the approval of the court, can refuse to perform certain large power contracts which still have some years to run and which by abnormal increases in cost have resulted in a loss to the company. It is expected that with this power and with the fact that the overwhelming majority of this class were willing voluntarily to modify their contracts the receiver will be able to adjust the contracts on a basis of fairness, which will result in an increase of revenue from \$140,000 to \$200,000 a year. Injunction suits against an increase in fare to 6 cents and an increase in electric and gas rates have been decided by the court of first instance in favor of the railway company."

**Further Hearings on Spokane Abandonment.**—Further negotiations between the city of Spokane, Wash., and the Washington Water Power Company will be held before the future of railway lines sought to be abandoned by the company is settled. The City Commissioners in conference declined to approve the adjustment whereby the company agreed to operate its cars on North Hamilton Street and South Maple Street, provided it was allowed to discontinue service on Second Avenue. The Commissioners felt that it would not be proper to secure service for one section of the city at the expense of another and that all lines should operate if the city was to give its approval to any settlement. D. L. Huntington, president of the Washington Water Power Company, expressed a desire to meet the wishes of the City Commissioners if it could be done and asked that the matter be allowed to remain open until further investigation. City officials are hopeful that the matter will be settled satisfactorily and that service will be restored on all lines.

**More Rhode Island Bondholders Organize.**—The Rhode Island Suburban Railway, owner of the main power house and considerable trackage operated under leases by the Rhode Island Company, Providence, for which permanent receivers have been appointed by the Superior Court of Rhode Island, has appointed a protective committee to

conserve the interests of the bondholders. Holders of bonds of the company are requested to deposit them with all coupons attached on or before April 15, with the National Exchange Bank, Providence, as depository under a deposit agreement. Michael F. Dooley, president of the National Exchange Bank, is chairman of the committee. The other members are Edward B. Aldrich, trustee of the Estate of Nelson W. Aldrich; Benjamin A. Jackson, president of the Rhode Island Suburban Railway; George L. Shepley, president of the Rhode Island Insurance Company; Frederick S. Peck, treasurer of Asa Peck & Company, Inc.; and Francis E. Bates, secretary pro tem of the National Exchange Bank, all of Providence.

#### Slight Increase in Interest Fund.

The operating statement of the Cleveland (Ohio) Railway for January shows that \$12,158 had been added to the interest fund, bringing it up to about \$35,800. From this it will be seen how close this fund, which is the barometer for the rate of fare, came to being wiped out. It was supposed not to go lower than \$300,000. No reduction in fare can be made until it reaches \$700,000. The company was forced to set aside \$123,000 from the January income to take care of the 6 per cent extra income tax on last year's revenue to comply with the new revenue law this year. Had it not been for this, a much larger sum would have been added to the interest fund. As this amount will not have to be set aside hereafter, some hopes are entertained that the interest fund will increase rapidly for the remainder of the year. January traffic showed a decline of 1.40 per cent from that of the same month in 1918, but the passenger earnings were about 40 per cent greater. The average fare for January, 1918, was 3.74 cents and for January, 1919, 5.31 cents.

**Results in Jersey in January.**—The Public Service Railway, Newark, N. J., in its monthly report, comparing January, 1919, and January, 1918, filed with the Board of Public Utility Commissioners as required by that board's order of July 10 last, shows that with the increased fare to 7 cents and a 1-cent charge for initial transfers the total passenger revenue for last January was \$1,892,145 and that for January, 1918, was \$1,385,095, while the total operating expenses for January, 1919, were \$1,425,259 and for January, 1918, they were \$942,325. While the increased rate of fare brought an increase to the company in passenger revenue the sum of \$507,049, operating expenses increased \$484,923. The report shows that the total income deductions were \$429,333 for January last and \$432,185 for January, 1918, and the net income deductions for last January \$65,990 and for January, 1918, \$76,873. For January, 1919, the revenue passengers carried were 26,366,858; transfer passengers, 6,266,321; revenue from cash fares, \$1,831,689; revenue from transfers at 1 cent each, \$60,455.



# Traffic and Transportation

## Courtesy Campaign

Chamber of Commerce, Springfield, Mass., Wants a "Courtesy City"—Railway in Plan

The convention department of the Chamber of Commerce of Springfield, Mass., has initiated a plan to encourage courtesy in the various groups of men who come in contact with the public, and from whom the visitor will obtain his first impression of Springfield. The campaign embraces the conductors and motormen, policemen, hotel clerks, red caps, newsboys and messenger boys as having unusual opportunities for rendering service to the traveling public. The general public has also been invited to participate in the campaign by the Chamber of Commerce.

### TO PATRONS OF SPRINGFIELD STREET RAILWAY

The Springfield Chamber of Commerce through its Courtesy Campaign Will Put Springfield on the Map as the

## Courteous City

Teach Courtesy by Practising Courtesy

If You See an Act of Courtesy by the Conductor or Motorman of this Car, write to the Committee about it. Your Letter will assist us in selecting the Most Courteous Conductor and Motorman. Your co-operation is solicited.

Address Chamber of Commerce Courtesy Committee.

CAR CARD AND DASHER SIGN USED IN COURTESY CAMPAIGN

Arrangements which the convention department submitted, applying especially to the conductors and motormen of the Springfield Street Railway Company, are as follows:

1. A committee shall be appointed, comprised of representatives of employees and officials of the street railway company and members of the Chamber of Commerce. This committee shall determine the conductor and motorman best liked by the public each month, during a period of six months, beginning March 1 and continuing to Sept. 1.
2. Notices shall appear in the trolley cars, announcing this contest and requesting the co-operation of the public by communicating with the committee whenever a conductor or motorman has exhibited any unusual courtesy to passenger or passengers. This committee shall determine at the end of each month, by the correspondence received, which motorman and which conductor have been most polite.
3. The Chamber of Commerce offers as a reward for this service a bonus of \$5 and an attractive medal to the contestants selected by the committee.
4. Arrangements shall be made with local newspapers to publish weekly articles concerning the contest, and at the end of each month, feature pictures and story regarding the successful contestants.

To encourage interest in this competition the cards reproduced in the accompanying engravings were prepared. One is a car card; the other is a dasher sign. The Chamber of Commerce also arranged for two talks on courtesy to the motormen and conductors by Dr. Stanley L. Krebs, member of the Institute of Mechanical Art, New York. These talks were given in the morning

and in the evening of Feb. 28 at the Assembly Room of the Hooker Street carhouse and attracted large attendance.

The courtesy campaign started on March 1 and will continue for six months. It is receiving much favorable comment in the local press.

## New Orleans Suggestions

Speaker Before Louisiana Engineers Points Out Ways of Improving Electric Railway Service

In a paper recently presented before the Louisiana Engineering Society W. T. Hogg discussed means of overcoming the "long, circuitous routes," and "clumsy transfer system" that in his

opinion characterize the electric railway system in New Orleans as operated by the New Orleans Railway & Light Company.

General principles upon which any changes for the New Orleans Railway & Light Company should be made were said to be the following:

1. Adoption of a standard spacing of parallel car lines according to (a) comfort and convenience and (b) traffic density (e.g., a spacing of six blocks is deemed acceptable).
2. Prohibition, wherever reasonable, of double-track lines on streets less than 60 ft. wide.
3. Routes as far as possible on boulevards for speed and safety.

Mr. Hogg worked out detailed routes to conform to these principles. For handling the extra cars during peak-load hours he suggested fast express service for long-haul passengers. He said that to secure an annual saving of \$500,000 by these means an initial capital expenditure of only \$150,000 would be required.

With efficient routing, it was said, the present equipment is sufficient to furnish a seat for every passenger even in rush hours with a reasonable degree of efficiency. As soon as financial conditions permit, however, 100 new cars of fifty-two-seat capacity should be purchased. These should be equipped for multiple-unit operation.

In regard to the question of con-

trol, Mr. Hogg said that in view of public distrust and the credit condition, only two courses are possible—foreclosure and the organization of an entirely new company or the purchase and the operation of the present railway property of the New Orleans Railway & Light Company by the city.

## Still Feels the Pinch

Flat Five-Cent Fare Established in Washington Last November Not Sufficient

Declaring that since the 5-cent fare became operative on Nov. 1, it has failed to meet its operating expenses, taxes and interest charges by \$65,911, the Washington Railway & Electric Company, Washington, D. C., has applied to the Public Utilities Commission for additional financial relief.

### SUBMITS THREE METHODS

No specific railway fare is recommended in the petition submitted, the railway proposing three methods by which revenue may be increased and recommending that these methods be considered by the commission. They are:

1. Increase in the initial rate of fare in the District.
2. Establishment of a zone system in the District, with the initial charge in one zone and an additional lesser charge in the second zone.
3. A charge for transfers issued by the company to its own lines and a charge for inter-company transfers issued to and received from the Capital Traction Company, the latter charge for inter-company transfers representing a differential in favor of the company in lieu of the establishment of joint rates between said companies arising out of the issuance of inter-company transfers.

The company says that the increased gross receipts resulting from the increased fares in the District and Maryland have been more than absorbed by operating expenses. In this connection the petition says:

The net results from railway operation for the month of December, 1918, we estimated would show a decrease in operating income of \$33,893, compared with the pre-war period. Since then our actual figures for December show this decrease to be \$37,103; and for January, 1919, a decrease in operating income of \$41,139, compared with the pre-war period, a loss further increased by additional interest charges of \$9,144, making a total of \$50,284.

### PETITION PRESENTS FIGURES

The petition then sets forth detailed figures for the months of November, December and January under the 5-cent fare showing that, out of its own earnings, it has failed to meet operating expenses, taxes and interest charges by \$65,911, in comparison with a surplus above such charges in the pre-war period. "From which it appears that decrease in net income would amount to \$550,183 annually," the petition avers. Previous to last November six tickets were sold for a quarter in Washington.

On March 10 the Public Utilities Commission fixed March 21 as the date for the hearing on the application of the company. The Capital Traction Company, which also operates in Washington, has not signified whether it will ask for a similar increase.

**COURTESY CAMPAIGN**  
**SMILE**  
**SAY PLEASE**  
**AND THANK YOU**  
**IT COSTS NOTHING**



## Seek Relief in New York State

### Hearing Before Joint Legislative Committee on Bill Designed to Permit Commission to Pass on Cases on Their Merits

The joint hearing of the Senate and Assembly judiciary committee of the Legislature of New York on the Carson-Martin bill, took place in the Assembly Chamber at Albany, March 12, starting at 2.30 p.m., and continued to 6.30 p.m. The Carson-Martin bill is designed to amend the Public Service Commission law by extending the jurisdiction of the Public Service Commissions over the rates, fares and charges of electric railways fixed by agreement with local authorities, notwithstanding limitations in their franchises.

#### OPPOSITION HEARD FIRST

The opposition to the bill was heard first. It was led by Corporation Counsel Burr of New York City. Mr. Burr also represented and spoke on behalf of the Mayors' Conference Committee. He read a long letter, practically a legal opinion which he had sent to Mr. Martin, chairman of the Assembly judiciary committee. In this letter Mr. Burr dealt principally with the Quinby, or so-called Rochester, case against the Public Service Commission, 223 N. Y. 244, placing his own interpretation on the opinion of Justice Crane, saying that the majority of the court had not sustained Judge Crane's deduction.

Mr. Burr contended that the present bill was extremely objectionable, not only in that it sought to deprive the Board of Estimate & Apportionment of New York City or other municipal authority of a voice in deciding whether the fare provisions should be increased, but furthermore in that it delegated to the commission alone the function of passing upon applications to increase fares merely upon the basis of determining whether the private companies are engaged in operating at a loss under the present value of their property.

#### CITY OFFICERS APPEAR

Former City Comptroller Metz and former Congressman of Greater New York also spoke against the bill, stating that the Chamber of Commerce of Brooklyn was opposed to the giving of the power provided in the bill to the Public Service Commission. He made it plain, however, that the Brooklyn body did not oppose any proposed increase of rates if better service were to be given by the operating companies than was being rendered at the present time. Other civic bodies of the city had also gone on record along this line. Stewart Brown, representing some 10,000 or more real estate owners of Greater New York, also spoke in opposition to the bill, mainly on the ground that the condition of affairs in which the railways now found themselves was largely brought about in the city of New York by the railways themselves through overcapitalization.

Other speakers appeared representing many of the upstate cities, princi-

pally those connected with the Mayors' Conference Committee. They alleged overcapitalization and watering of stock, high rentals and excessive salaries.

Those in favor of the bill were led by A. W. Loasby, president of the First Trust & Deposit Company, Syracuse, Ex-Supreme Court Justice and Governor Charles Evans Hughes, representing the Equitable Life Assurance Society, New York Life Insurance Company and the Metropolitan Life Insurance Company, which hold and represent more than \$43,000,000 of the securities of the railway companies; Mr. Cobb, Boston, representing more than 5000 stockholders of the local railways in New York City, and A. E. Kalbach, receiver of the Second Avenue Railway, New York City.

Mr. Hughes said that the bill did not increase or reduce rates or fares. It fixed no definite rate nor did it change the basis now established by the statute upon which reasonable rates were to be determined. It was proposed by the pending bill to amend the Public Service Commission's law so as to confer upon the commissions the power in a proper case to fix a rate of fare to be charged by a railroad corporation or a street railroad corporation, "notwithstanding a definite rate, fare or change prescribed by any franchise or contract of the local authorities of any city or other political subdivision of this State," etc.

According to Mr. Hughes the pending bill if enacted into law would confer upon the commissions in clear and definite language the power to change rates in such cases as that in Rochester, so that the rates to be charged should be just and reasonable. He said that until the Court of Appeals decision in the so-called Rochester case it was supposed that the commissions had plenary power over rates and that the power of the commissions affected every electric railway in the State, whether this rate was fixed by general or special statute or by franchise or by contract with a municipality.

The Quinby, or Rochester decision, however, seemed to lay down the rule that, although the Legislature had definitely delegated to the public service commissions the power to change rates of fare and raise or lower them so that they should be just and reasonable, there was no distinct statement of legislative intent to give the commissions power to change rates which had been fixed by agreement with municipalities.

Mr. Hughes contended that the matter of rates was within the control of the State in its exercise of the police power and that agreements with local authorities did not deprive the State of its authority to supervise rates and to determine the just and reasonable rates to be charged. He said that in the Quinby case the power of the Legis-

lature had not been denied and that the clear expression of opinion in the so-called South Glens Falls case established the power of the Legislature beyond any reasonable question.

Mr. Hughes said there was no basis for the contention that the provision of the Constitution as to local consents has in any way ousted the Legislature of its police power or of its normal governmental supervision of charges. The constitutional provision as to consents contained no language permitting such a conclusion. Such an ousting of the Legislature of its appropriate powers of protection could not be implied. Municipal contracts, including franchise agreements, were at all times presumed to be subject to the police power of the State acting through the Legislature or through a duly authorized agency.

Under the Public Service Commission's law, the railroad law and the laws of the State of New York as they now stood, electric railways throughout the State were facing bankruptcy. The magnitude of the disaster which would follow wholesale receivership was apparent only when one considered that the securities issued by these companies were not held by a few persons or corporations, but were held by a large number of persons in small amounts. Mr. Hughes said that the enactment of the pending bill would go a long way toward correcting the enormous shrinkage and loss of credit of the companies and also a long way toward restoring public confidence.

Mr. Kalbach stated that the Second Avenue Railroad had been in the hands of a receiver since 1908. Due to the stress of the present time the company would probably be unable even to pay the interest on the certificates which had been issued by the receiver.

Ex-Judge Nathan L. Miller of the Court of Appeals, of Syracuse, representing financial institutions of the city of Syracuse, appeared in favor of the bill. He reiterated and sustained many of the points made in the argument of Judge Hughes. Mr. Miller said that the Legislature has the power to grant to the commission the relief sought in the bill.

A feature of the hearing was the appearance of representatives of the employees seeking the passage of the bill.

Letters from financial institutions and banks were read, and speakers and representatives in person appeared in favor of the bill from every corner of the State.

A. W. Loasby stated that the principal interest of the bankers centered in the fact that they and individuals in the State hold more than \$1,500,000,000 of securities of the electric railways as investments and that under the present conditions the value of these securities was seriously jeopardized owing to the inadequate earnings made by the companies.

In addition to those already mentioned there were present one or more officers of nearly every electric railway in the State.



## Wants Local Line Segregated

**Bridgeport Committee Recommends Relief for Connecticut Company, Hoping for a Return to the Five-Cent Fare**

After months of investigation the traffic commission of Bridgeport, Conn., in its report submitted to the Common Council recommended the return of the 5-cent fare on the lines of the Connecticut Company in Bridgeport with a five-minute service on all lines. The 6-cent fare, under the present service conditions, is characterized as "useless," to meet the company's financial burden. The report has been referred to the miscellaneous committee for consideration. The commission's report embodies a number of important recommendations, including the following:

1. Separation of the local electric railway lines from the Connecticut company to permit a trial period within which the local trolley properties may be operated independent of the Connecticut Company's properties as a whole.
2. Regulation of jitney buses, including provision for the filing of an adequate surety bond to protect passengers in case of accident.
3. Radical changes in the regulation of vehicular and pedestrian traffic, suggesting ordinances similar to those in force in other metropolitan cities.
4. Installation of at least fifty Birney one-man cars with a view to operating suburban and interurban cars within the city limits on the skip-stop system, leaving the local and short haul business to the one-man cars.
5. Appointment of a committee to include the trustees of the Connecticut Company to devise means to finance and carry out the recommendation that the local lines be operated as a separate unit.

In considering the Connecticut Company's properties as a whole the committee calls attention among other things to the following facts:

Although the cost of labor, materials, supplies and equipment has increased in some instances more than 200 per cent, the income of the Connecticut Company has decreased to such a point that expenses are greater than revenue.

The company now carries a passenger from Ash Creek to Devon, about 11 miles, for one fare, 6 cents. The same distance on the steam railroad costs 33 cents.

The point is that the railway is giving its patrons service at less than cost. This, of course, cannot continue indefinitely without a complete and utter collapse of the railway fabric.

Entering into the cost of this service is the requirement made by cities that the railway pay for paving between its rails and 2 ft. on either side.

This has cost the Connecticut Company an average of \$310,000 a year on its system since 1913, to which must be added approximately \$200,000 of expense incurred in replacing of rails and ties incidental to the new paving, and in many cases this \$200,000 expenditure could have been delayed a few years were it not for the requirements of the cities that new pavement be placed.

Summed up, payments to the State and communities amount to more than \$1,180,000 a year, or more than 10 per cent of the company's gross income.

These taxes and assessments represent a tax of \$2,100 for every car operated by the company, while the jitneys pay an average of less than \$21, and operate over paving paid for largely by the trolley riders. In other words, the tax paid by the railway, per car, is 100 times the amount paid by the jitney owner. Everybody knows how they congest the streets, prevent the people from getting aboard railway cars and in general endanger the public, without being responsible for accident to their patrons.

If the electric railways were in the same position that other public utility companies are, they would be required merely to replace pavement in as good condition as they found it when making changes, yet they are required to pay for new pavements to the extent of more than \$300,000 a year.

The policy of the State has not permitted such an unfair competition with its water, gas, electric light and telephone companies, and it should regulate the jitneys as to routes and hours of service, and require a surety to guard against loss of life or injury by accident.

Your commission is presenting these facts as they must be taken into account in considering the problem of securing adequate trolley service at a minimum fare.

The committee points out that the Connecticut Company has suitable equipment to cover suburban and interurban service, and with the installation of a liberal number of safety cars, it is the opinion of the commission that if the local system were operated as a unit under the recommendations summarized previously in this article, it would be possible to secure financial relief and the hearty support of the riding public, with a resulting return to the 5-cent fare for a reasonable haul.

The committee recommends in consideration of its general findings that the necessary action be taken to empower the city attorney to appeal to the United States District Court for a modification of the decree under which the trustees of the Connecticut Company operate, to permit a trial period within which the local railway properties may be operated independent of the Connecticut Company's properties as a whole.

## Pacific Electric Wants General Increase

Following its action of a few days ago, in which it asked the Railroad Commission to increase its fares in Los Angeles by constricting the 5-cent zone and providing a blanket fare of 8 cents, the Pacific Electric Railway on March 3 filed an application with the commission for authority to make a general increase in its passenger rates. It asks that in all points outside of the city of Los Angeles it be permitted to establish a cash 7-cent fare where the same is now 5 cents; also a coupon book of twenty tickets to be sold for \$1, the tickets to be used within ten days and at the rate of not more than two a day, the idea of the book being to maintain the 5-cent fare for the daily rider. This latest proceeding affects fares within the cities of Glendale, Long Beach, Pasadena, Pomona, Redlands, Redondo Beach, Riverside, San Bernardino, San Pedro, Wilmington, Santa Ana, Santa Monica, South Pasadena, Venice and Santa Monica-Ocean Park-Venice-Playa del Rey.

In these communities the Pacific Electric Railway would charge the 7-cent fare and sell the coupon books. The company also asks for authority to have its minimum charge for interurban fares increased from 5 to 7 cents, and that the 10-cent round-trip fare be made 14 cents. The interurban fares will affect Claremont, Colton, Lankershim, Ontario, Fullerton, Glendale and practically all the small towns and cities on the 600 miles of track operated by the Pacific Electric Railway.

The company also wants permission to charge \$1.40 for forty-ride school tickets that now sell for \$1.

## Metal Tokens at Boston

**Public Appreciates Them as Far Superior to the Pasteboard Tickets Which They Replace**

Metal tokens replaced paper tickets on the entire system of the Boston (Mass.) Elevated Railway beginning Feb. 22. Each token is good for one fare, the present unit being 8 cents. The tokens are slightly larger than a 5-cent piece. They are sold by all conductors, at prepayment stations and in various designated stores in different parts of the metropolitan district.

### WOODEN TICKET BOXES REPLACED

The wooden ticket boxes used on all cars were removed mainly during the night before the metal tokens became valid for transportation, and fare boxes were substituted for them. This was a simple matter as fare boxes were used previously to the paper tickets and practically all cars were already equipped with fare box standards, the fare boxes and registers being stored for use with the metal tokens.

Each token bears on one side the inscription "Good for One Fare" and on the reverse side the signature of H. L. Wilson, treasurer of the company. When the metal tokens were adopted the company issued a regulation rendering all paper tickets invalid for transportation. These paper tickets were redeemed either at the company's offices or were exchanged for metal tokens in the conductors' hands.

Passengers are required to deposit their tokens personally in the fare boxes. It is expected that the use of the tokens and recording fare boxes will decrease losses in revenue accruing from misuse and theft of paper tickets. In case a two-zone fare system goes into effect in April, as planned, the tokens can be used in place of nickels, if desired.

The tokens used at Boston were purchased from the Waterbury Button Company, Waterbury, Conn. The order was for 3,000,000 of the disks. The tokens are of so-called "high brass" and weigh about 10 per cent less than a 5-cent piece, being of the same diameter and thickness. They are now made in a single stamping operation, a pressure of about 16 tons being applied in "minting" each token. No changes were required in the fare boxes. The public appears to appreciate the tokens as far superior in convenience to the pasteboard tickets which they replace. From 600,000 to 700,000 tokens are used daily on the system.

### STORY OF COUNTERFEITS DENIED

Erroneous press accounts have recently appeared at Boston and elsewhere to the effect that the company was being flooded with counterfeit tokens, metal slugs, buttons, etc. Inquiry at the office of H. L. Wilson, treasurer of the company, by the representative of the ELECTRIC RAILWAY JOURNAL at Boston, disclosed the fact that only two counterfeit tokens have so far been received, and one of these was taken



from a transfer box. Both were wretched imitations of the genuine tokens, one being lead-colored and the other roughly stamped and entirely devoid of the clear-cut characteristics of the tokens themselves.

A few tokens have been used by excited or careless patrons of the local telephone company in place of nickels, possibly a dozen a day. Mr. Wilson said he could not imagine where the story originated that the company was being inundated with spurious coins and tokens. He stated that on the average the company receives only \$2.50 to \$5.50 in counterfeit money for every \$500,000 taken in. The fare boxes are constructed so that the conductors can see what every passenger drops in, and at all the subway entrances electric lights are installed above the boxes so that the collectors can detect a fraud immediately.

### Suburban Increase Denied at Ottawa

The Railway Commission of Ontario, has disallowed the proposed new tariff of fares on the Ottawa Electric Railway. The application was filed some months ago. It provided for a zone system with heavily increased rates between the city limits and points outside on the eastern and western extensions of the system.

The application for disallowance was made by the village of Westboro and the township of Nepean, supported by the city of Ottawa. The tariff was suspended by the commission when the application was made to the Railway Commission.

The board found that, after maintaining a 15 per cent dividend and paying interest on its funded debt, the company's returns showed it to be almost \$500,000 better off than it was before the war. Under the circumstances the board did not think the company justified in increasing its rates to suburban points.

The recent substantial wage increases were given consideration by the Railway Commission, but against this extra expense there was the additional revenue accruing to the railway from the abolition of the six-for-a-quarter tickets.

The increases sought under the proposed tariff, while not affecting journeys from point to point within the city limits, represented advances of from 100 to 200 per cent in journeys between the city and outside points on the line. The Britannia line, standing alone, the Railway Commission found not remunerative, but said that the line must be considered as a part of the general system.

Paralysis of the port of New York by the strike of harbor workers threatens a coal famine which may restrict, if not stop, operation of subway, elevated and surface car lines unless there is prompt relief.

## Transportation News Notes

**Safety Cars for Pacific Electric Railway.**—Twenty one-man safety cars have been delivered to the Pacific Electric Railway, Los Angeles, Cal. The cars will be used on unimportant runs in Pomona, San Bernardino, Riverside, Pasadena and Santa Monica. None of the cars will be used on the Los Angeles city lines or in the interurban service.

**A Bold Bid for Business.**—The Chicago, Ottawa & Peoria Railway, Joliet, Ill., effective on April 1, will handle all kinds of express on all of its passenger cars at rates 25 per cent lower than charged by other lines, without pick-up or delivery service. There will be a minimum charge of 20 cents except on empty carriers, on which the charge varies.

**Jitneys Must Run Always.**—The City Commission of Atlantic City, N. J., has decided that jitney owners must operate their cars during the winter as well as in the summer or their licenses will be revoked. All licensed jitneys must operate the full twelve months of the year for which they are licensed. The City Commission licenses only a limited number of such vehicles.

**Liberty but Not License in Kentucky.**—The Louisville (Ky.) Police Department in handling Mardi Gras celebrations this season, permitted masqueraders on electric cars on their way to parties, but placed a ban on masqueraders on the down-town streets. In past seasons masked persons have been banned from cars, due to several fights, in which it was difficult to apprehend those guilty.

**Railway Considers Service Order Unreasonable.**—The Chicago, South Bend & Northern Indiana Railway, South Bend, Ind., has petitioned the Public Service Commission of Indiana for relief from an ordinance passed by the Council of South Bend on Feb. 10, requiring the company to operate cars on all of the city tracks every fifteen minutes. The company complains that public convenience does not require such service; that it would be impossible to comply with the ordinance for various reasons, and that the ordinance generally is unreasonable.

**No One-Man Cars at Present.**—T. J. Minary, president of the Louisville (Ky.) Railway, has branded as premature the reports relative to the company adopting the one-man car system on several lines upon which single-truck cars are operated. He said: "No action whatever has been taken in Louisville, to that end. Of course we are considering various methods of increasing earnings, and meeting the increased wage as authorized by the War Labor Board, but it is too early yet to talk

about one-man cars. We don't know yet what the city is going to do."

**Would Legislate Against Fares.**—An act to abolish the 5-cent fare zones at present in effect on the lines operated by the Rhode Island Company, Providence, R. I., has been introduced in the House of Representatives by Representative John A. Hamilton, Cranston. The act would restore the old zone limits and permit a charge within those limits of more than 5 cents, the Public Utilities Commission being empowered to fix the rate, although a maximum of 8 cents is stated. The act provides further for the issuance of special commutation and excursion tickets on lines which the commission judges requires such action. The measure was referred to the judiciary committee.

**Six-Cent Fare Possible in San Francisco.**—At a recent meeting of the public utilities committee of the Board of Supervisors of San Francisco, Cal., Fred Boeken, superintendent of the Municipal Railway, replied to demands for extensions which he felt sure would not be self-supporting, by the statement that the policy of making unprofitable extensions, if continued, will force the city to a 6-cent fare or some other means of making up the deficit that would be bound to result. The Parkside district beyond the tunnel was the particular territory under discussion, but unprofitable extensions in other parts of the city would be in the same classification. Mr. Boeken asserted that the city is losing money on the E, H and K lines; just paying expenses on the F and J lines; making a little more than expenses on the D line, while A, B and C lines are profitable.

**Interference with Service Cut Prevented.**—Judge Martin J. Wade of the Federal Court has issued an order restraining Judge Hubert Utterback of the Polk County district court from in any way interfering with the Des Moines City Railway case. Earlier in the week Judge Utterback had refused to dissolve a temporary restraining order preventing the reduction in service proposed by the Des Moines City Railway as a result of the recent decision in the fare case. City attorneys brought the injunction proceedings to forestall the service cut and the hearing on the permanent injunction had been set for trial by Judge Utterback. Judge Wade's order prevents any further consideration in the district court. Judge Wade ordered a further hearing on the restraining order for March 11 at Ottumwa, Iowa. Officials of the Des Moines City Railway have announced that pending Judge Wade's decision they will make no attempt to cut the service.

**Wants Fare Order Set Aside.**—The city of Cranston, through its solicitor, Frank H. Wildes, has filed in the Supreme Court of Rhode Island an appeal from the order of the Public Utilities Commission issued on Feb. 26 voluntarily extending for two months the experimental period for the operation of



the increased fares on the lines of the Rhode Island Company, as permitted originally on Oct. 23, 1918. The petition states that the residents of Cranston are affected by the order of Feb. 26 in that the changes made in the original order, that is, 2-cent zones to be 5 cents, the additional zone on the Oaklawn line and the dividing of the crosstown line into two zones are to remain in effect until May 1, whereas when the increase was granted originally, the time limit was set at March 1. The petition sets forth many alleged inequalities and unjustified charges and asks the court to review and grant relief wherever the rates under the new order are deemed to be unfair, unjust and discriminatory.

**Closed Vestibules and Folding Steps Ordered.**—To reduce the number of boarding and alighting accidents in connection with electric railway operation the Public Service Commission for the First District, on motion of Acting Chairman Travis H. Whitney has directed the several electric railways in New York to install closed vestibules and folding steps upon the major part of their rolling stock. The reasons for the direction of the commission were set forth in an opinion by Acting Chairman Whitney which has been approved by the commission. As the result of extensive investigations the commission is convinced that a major portion of the casualties which occur on street railroad lines in New York City are the result of boarding and alighting accidents. Several years ago the Third Avenue Railway System equipped practically all of its closed cars with closed vestibules and folding steps and with a device—which the commission believes should also be generally installed—to prevent vestibules being opened while the car is in motion. As a result of this installation the number of accidents upon this system has been greatly reduced.

**Results with Fare Boxes in Washington.**—The Capital Traction Company Washington, D. C., has equipped all the cars of its Georgetown division with fare boxes, sixty-five of the boxes being in use at this time. Fare boxes will be installed in cars of other lines as rapidly as possible. Equipment of all cars on its Columbia division with fare boxes is announced by the Washington Railway & Electric Company. Just what lines will be the first to be equipped with the new boxes has not yet been decided. If the shipment contains a sufficient number to equip all cars of the Georgetown line, that line will be the next to get the devices. If the number is not sufficient to equip all cars on the Georgetown line, some other division with a smaller number of cars will get the boxes. Both companies report that the number of fares turned in from cars equipped with the new fare boxes remains practically as high as during the first week after installation of the boxes. The first fare boxes were installed on cars in Washington on Jan. 26. Both companies advertised the change extensively.

## Legal Notes

**NEW YORK.**—*Duty to Public Must Be Discharged, Even if Property Is Operated at Loss. Corporation on Same Footing As Individual.*

That a railway company cannot operate its railway at a certain rate of fare without loss does not constitute an excuse for failing to discharge its duty to the public, arising on contract voluntarily assumed.

In regard to the modification or abrogation of contract obligations voluntarily assumed, public service corporations stand on the same footing as individuals.

That the employees of a public service corporation demand wages which the corporation regards as excessive does not relieve it from its contract obligations to the public. (Public Service Commission, Second District, *vs.* International Ry., 172 New York Sup., 551.)

**NEW YORK.**—*Mandamus Should Not Issue Where There Is Impossibility of Performance.*

In a proceeding for mandamus by the Public Service Commission, requiring a street railway company to operate cars within two days, it was error to grant the writ, where the company is thereby required to take striking employees back, which it cannot do because they demand a retroactive scale of wages, payment of which was impossible on account of lack of funds. (Public Service Commission, Second District, *vs.* International Ry., 120 Northeastern Rep., 727.)

**NORTH CAROLINA.**—*Carrier Responsible for Acts of Strangers Only When They Can Be Anticipated.*

A carrier is liable for injuries to passengers caused by wrongful acts of strangers, if they could be reasonably anticipated, but is not liable for injuries caused by the premature starting of a car due to the pulling of the bell rope by an intoxicated passenger, where the conductor had no knowledge of the intoxication and such third person had been orderly up to that time. (Pride et al. *vs.* Piedmont & Northern Ry., 97 Southeastern Rep., 418.)

**DELAWARE.**—*Public Utilities Commission Has Power to Regulate Fares.*

An order of the board of public utility commissioners, created by legislative act and given supervision over public utilities, fixing rates to be charged by traction companies, was not void as an exercise of delegated legislative power. (Robertson et al. *vs.* Wilmington & Philadelphia Traction Co., 104 Atlantic Rep., 839.)

**FEDERAL COURTS.**—*Public Utilities Commission Has Power to Regulate Fares in Colorado.*

Though a town ordinance, granting, under a law of Colorado, a street railway franchise, allowed certain fares on condition that transfers were given to the line of another company, held, the State, without impairing the obligation of contract, could empower the Public Utilities Commission to regulate the matter of fares. (City of Englewood *vs.* Denver & South Platte Ry., 39 Supreme Court Rep., 100.)

**MASSACHUSETTS.**—*Maintenance of Bridge Required under Agreement "to Hold City Harmless from Operation."*

The covenant of an electric railway company to save the city harmless from all loss, cost, or damage from construction and operation of extensions of road, held comprehensive enough to include an obligation to save the city harmless from one-quarter of the expense of maintaining bridges on the railroad's locations as extended, apart from any obligation imposed by law before the enactment of the statute. (City of Northampton *vs.* Northampton, Street Ry., 121 Northeastern Rep., 495.)

**NEW YORK.**—*Rights of Public to Good Service Paramount.*

In proceedings to compel public service companies to comply with an order of Public Service Commissioners to procure and place in operation additional cars, the court should give little heed to nice considerations of equity; the rights of the public being paramount, and the maxims, "He who seeks equity must do equity," and "He who comes into equity must come with clean hands," being pertinent. (Public Service Commission, First District, *vs.* Brooklyn Heights R.R., 172 New York Sup., 790.)

## New Publications

### Employment Management

Handbook on Employment Management in the Shipyard. Bulletin II, the Employment Building. United States Shipping Board Emergency Fleet Corporation, Philadelphia, Pa.

Employment departments of electric railways may find suggestions of value to them in this illustrated booklet on employment work in a different field.

### Statistics of Railways in the United States for the Year Ended Dec. 31, 1916

Thirtieth Annual Report of Interstate Commerce Commission. Government Printing Office, Washington, D. C. Paper, 20 cents.

This pamphlet gives the latest official statistics of earnings, capitalization



and the like for the steam railroads of the country.

#### Boiler and Furnace Testing

By Rufus T. Strohman, associate editor Power. Engineering Bulletin No. 1 of the Bureau of Conservation, United States Fuel Administration, Washington, D. C. Copies can be obtained free from the administrative engineer of any state or from the Bureau of Conservation.

This little pamphlet is a practical treatise on the subject covered by its title and is intended to enable power plant operators to secure the best possible results from their equipment. It would seem to be the duty of everyone who is responsible for the consumption of power plant coal to secure a copy of this little pamphlet and read it.

#### Comparison of Workmen's Compensation Laws of the United States Up to Dec. 31, 1917

By Carl Hookstadt. Bulletin No. 240, Bureau of Labor Statistics, Superintendent of Documents, Government Printing Office, Washington, D. C. 106 pages. Paper: 15 cents.

This bulletin summarizes and compares the principal features of the workmen's compensation laws of the several states and territories. It is a revision of a study made in 1916. Since the former report twenty-seven states have amended or supplemented their compensation laws, and five new states have been added, making a total of forty states, territories and possessions.

#### Books About World Trade, Ships and the Ocean, Foreign Countries, and Foreign Languages

Compiled for the United States Shipping Board by the Free Public Library of Newark, N. J.—Miss. M. L. Prevost, compiler under direction of John Cotton Dana, Librarian.

The new merchant marine of the United States stimulates interest in ships and world trade, as well as other countries, the chief foreign languages used in commerce, methods of conducting world trade, etc. With a view to guiding business men, as well as general readers, the United States Shipping Board has had compact lists of good books compiled by the staff of the Free Public Library, Newark, N. J., an institution with a national reputation for its business reading service.

#### Fuel Economy in Boiler Room

By A. R. Maujer and Charles H. Bromley. 308 pages. Cloth, \$2.50 net. McGraw-Hill Book Company, Inc., 239 West Thirty-ninth Street, New York City.

This is a book for the practical man who wishes to apply in the boiler room the methods which will conduce to efficient operation. It is an extension of the book entitled "Fuel Economy and CO<sub>2</sub> Recorders" by the same authors published in 1914. The new material includes fuels, firing methods, combustion of coal from the practical standpoint, fuel-oil burning, stoker operation, boiler settings, burning low-grade fuels and waste gases, ready means of checking boilers and furnace efficiency, etc. The method of presentation is direct and simple, and the book can be used with profit by the fireman and the water tender on one hand and the manager on the other.

## Personal Mention

Lorne C. Webster has been elected president of the Quebec Railway, Light, Heat & Power Company, Quebec, Que., to succeed the late Sir Rudolphe Forget.

L. R. Schenck, formerly treasurer of the Toledo & Indiana Railroad, Toledo, Ohio, has been elected president of the company to succeed D. D. Schenck, deceased.

W. Grissel has been appointed chief engineer of power station of the Cincinnati, Georgetown & Portsmouth Railroad, Cincinnati, Ohio, to succeed C. H. Erion.

Haven C. Kelly has been appointed superintendent of track and roadway

Cities Company, with headquarters at New Orleans, La., to succeed Charles B. Murphy.

W. K. Dunbar, assistant secretary of the American Water Works & Electric Company, New York, N. Y., has also been appointed assistant treasurer of the company.

William F. Brown has been appointed secretary and treasurer of the New York & Long Island Traction Company, Hempstead, L. I., to succeed Frank E. Haff.

H. W. Potter has been appointed treasurer of the Toledo & Indiana Railroad, Toledo, Ohio, to succeed L. R. Schenck, who has been elected president of the company.

F. L. Winters, division superintendent of the New Orleans Railway & Light Company, New Orleans, La., with jurisdiction over the railway lines operating below Canal Street, has resigned.

Nelson R. Troutman has been appointed roadmaster for the Trenton & Mercer County Traction Corporation, Trenton, N. J. He was formerly employed by the United Traction Company, Albany, N. Y.

J. M. Johnson has been appointed superintendent of the Ithaca (N. Y.) Traction Company to succeed Howard Morgan. Mr. Johnson has also been appointed purchasing agent of the company to succeed T. P. Clancy.

Charles Page, president of the Sand Springs Railway, Tulsa, Okla., has also been appointed treasurer of the company to succeed E. M. Monsell. Mr. Page was treasurer of the company previous to the appointment of Mr. Monsell to that position.

William F. Gorenflo has resigned as manager of the Gulfport & Mississippi Coast Traction Company, Gulfport, Miss., but he will not sever his connection with the company before June 1 next. Mr. Gorenflo has been manager for the company for several years.

S. S. Crane has been appointed general manager of the Johnstown (Pa.) Traction Company in connection with his position as general manager of the Altoona & Logan Valley Electric Railway, Altoona, Pa. His time will be divided between the two properties.

L. A. Williams has been appointed assistant superintendent of transportation of the Boston Creek-Camp Custer and Battle Creek City divisions of the Michigan Railway, Battle Creek, Mich. Mr. Williams was formerly trainmaster of the Camp Custer division.

James H. Wilkerson, Chicago, Ill., has been appointed a member of the Public Utilities Commission of Illinois to succeed Fred E. Sterling, who resigned to become State Treasurer of



H. C. KELLY

of the Chicago (Ill.) Surface Lines, assuming this new position on Feb. 16. Mr. Kelly entered the service of the Chicago City Railway in 1910, as engineer of construction, filling that position until 1913, when the unification of the various lines was perfected. He was then made a divisional superintendent, occupying that position until the present appointment. Mr. Kelly was born in Parkersburg, W. Va., in 1880. Immediately after leaving school he entered the service of the Baltimore & Ohio Railroad, at Parkersburg, in the engineering department. In 1904 he became connected with the Missouri Pacific Railway at St. Louis as district engineer in charge of construction work, remaining there six years, when he entered the service of the Chicago City Railway as engineer of construction, and has been continuously in their employ since that time.

Charles E. Serviss has been appointed general manager and purchasing agent of the Springfield & Xenia Railway, Springfield, Ohio, to succeed J. F. Egolf.

W. E. Schuppert has been appointed assistant secretary of the American



Illinois. Mr. Wilkerson was formerly First Assistant Attorney General of Illinois.

**Herman Berg**, formerly chief clerk to C. E. Bode, general freight agent for the Illinois Traction System, Springfield, Ill., has accepted a position as chief of the tariff bureau for the Chicago, Indianapolis & Louisville Railroad Company (Monon Route), with headquarters in Chicago.

**Harry Darby**, foreman of the Poland carhouse of the New Orleans Railway & Light Company, New Orleans, La., has been appointed division superintendent of the company with jurisdiction over the railway lines operating below Canal Street. He succeeds F. L. Winters, resigned.

**J. M. Joel**, formerly auditor of the Syracuse and Utica lines of the New York State Railways, and since April, 1918, auditor of the Rochester lines also, was made general auditor of the

ceed M. F. Flatley, who, as noted in the *ELECTRIC RAILWAY JOURNAL* for July 27, 1918, resigned to become master mechanic of the Lackawanna & Wyoming Valley Railroad, Scranton, Pa.

**J. R. Ong** has been appointed transportation engineer of the Winnipeg (Man.) Electric Railway, having resigned from a similar position with the Board of Control of the Kansas City (Mo.) Railways. Mr. Ong was formerly connected with the staff of the Wisconsin Railroad Commission.

**J. S. Coleman** has been appointed general manager of the Asheville & East Tennessee Railroad, Asheville, N. C., to succeed Stanley Howland, who still retains his position as vice-president of the company. Mr. Coleman has also been appointed treasurer of the company to succeed Reginald Howland.

**Capt. F. R. Glover**, general executive assistant of the British Columbia Electric Railway, Vancouver, B. C., is back again on the company's management staff, after being on military duties more than three years. He returned from Europe a year ago and since then has been superintendent for the Dominion police, with headquarters at Victoria. The duties of this force were recently taken over by the Royal North West Mounted Police. This made it possible for Captain Glover to resume his duties as general executive assistant.

**C. Walter Gifford**, an employee of the Bay State Street Railway, Boston, Mass., since 1910 and lately working under Transportation Manager Hiram Sparks as efficiency and service man, has been appointed general manager of the Brockton & Plymouth Street Railway, Plymouth, Mass., to succeed J. L. Smith, who has been transferred to another position. Mr. Gifford entered the employ of the Bay State Street Railway as conductor in 1910, was made night foreman at the Torrey Street carhouse in 1912, dispatcher in 1914, and day foreman at the carhouse in 1917. Last April he became traveling inspector and in July was appointed to the position from which he has now resigned.

**B. C. Edgar** on March 1 succeeded F. W. Hoover, vice-president, in active charge of the affairs of the Tennessee Power Company and the Chattanooga Railway & Light Company, Chattanooga, Tenn. Mr. Hoover retains his position as vice-president and remains as a member of the board of directors. Mr. Edgar will retain the position which he has held previously as general superintendent of the Nashville Railway & Light Company. He will divide his time between Nashville and Chattanooga. Mr. Hoover has become vice-president and director of sales of the Lucey Company. Later it is expected that he will become president of the company, to succeed Captain Lucey, who will become chairman of the board. Both the Chattanooga and the Nashville properties are controlled by Clark interests.

**Charles S. Banghart** has been appointed general manager of the Augusta-Aiken Railway & Electric Corporation, Augusta, Ga., by The J. G. White Management Corporation, New York, N. Y., the operating managers. He succeeds W. C. Callaghan, who has resigned. Previous to accepting his present position, Mr. Banghart was vice-president and general manager of the Binghamton (N. Y.) Railway, with which he was associated since 1914. Mr. Banghart attended Lehigh University, South Bethlehem, Pa. After leaving school, he was employed respectively on the electrifications of the Allentown & Bethlehem Rapid Transit Company, Allentown, Pa., and the Union Railway, New York City. In 1894 he became superintendent of the Flushing & College Point Lighting, Power & Railway Company, Flushing, N. Y. From 1895 to 1903 Mr. Banghart was associated with the Interstate Railway, Reading, Pa. He was employed by the New York &



J. M. JOEL

company at the last meeting of the board of directors. Since April, 1918, his headquarters have been at Rochester. Mr. Joel has worked his way up consistently with the local properties during the last twenty-eight years. He filled the posts of general clerk, voucher clerk, bookkeeper, chief clerk and auditor of the Syracuse Consolidated Street Railway and its successor, the Syracuse Rapid Transit Railway. One after another of the auditorships have since been added to his jurisdiction, leading up to the general auditorship of the State Railways. Mr. Joel has taken an active interest in the affairs of the American Electric Railway Accountants' Association, serving for a time on the joint committee of engineering accounting.

**J. C. Nelson**, vice-president and general manager of the Empire United Railways, Inc., Syracuse, N. Y., has been elected vice-president of the Ithaca (N. Y.) Traction Company, to succeed Charles E. Hotchkiss. Mr. Nelson has also been appointed general manager of the company.

**Henry Lee** has been appointed master mechanic of the Dayton & Troy Electric Railway, Dayton, Ohio, to suc-



C. S. BANGHART

Queens County Railway, Long Island City, N. Y., from 1903 to 1914, serving six years as general superintendent. In 1914 Mr. Banghart took up his duties as vice-president and general manager of the Binghamton Railway.

## Obituary

**E. P. Gerry**, superintendent of the railway lines in Elgin, Ill., before their absorption by the Aurora, Elgin & Chicago Railroad, died on March 4 at the age of seventy-five years.

**William B. Craig**, traffic manager for the Oklahoma Union Railway, Tulsa, Okla., died on Feb. 21 from an attack of apoplexy. Mr. Craig was a well known railroad man of Oklahoma, although his connection with the Oklahoma Union had covered a comparatively short period. All his earlier experience had been with steam lines, but he was regarded as one of the best informed traffic men in the State of Oklahoma.



# Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER,

SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES

BUSINESS ANNOUNCEMENTS

## Construction Field Shows Some Bright Spots

### Plans for Extension of Lines and Addition of Rolling Stock and Buildings Make Fair Showing for First Two Months

Recent inquiries among manufacturers and manufacturers' agents have in general failed to bring forth replies of a very optimistic nature in regard to definite orders expected in the near future. Optimism is generally running high that business, when it does return, will surpass pre-war levels, but it is purely a matter of conjecture as to when this will occur. Many inquiries on price and deliveries of electric railway equipment of all kinds have been and are still being received, but producers think these are sent out more for the purpose of feeling out the market than in a serious buying mood.

During the first two months of this year several orders have been given and many plans filed showing the serious intentions of traction companies to do some work on the extension of their tracks and transmission lines, replacement of worn-out materials, in construction of power houses, shops, terminals and other buildings and in the purchase of new or the remodeling of rolling stock. Reports of such activities have come from practically every state and territory of the Union and the items enumerated herein refer only to work in the United States. Canada, however, has ordered and laid plans for a by no means inconsiderable amount of electric railway material.

Below is given a résumé of the construction reports that have appeared in the *ELECTRIC RAILWAY JOURNAL* during January and February.

Up to March 1, the reports show orders placed for 102 new cars. Reports have been received that about thirty electric railways expect to order more than seventy-one safety cars this year, seventy-seven large type and suburban cars, three passenger and more than ten freight trail cars, and expect to remodel more than fifteen cars besides those already in their shops. One company has authorized \$125,000 for rolling stock.

For track extensions certain figures have been given, but much more is contemplated which has been reported merely as extensions and repairs to lines and track, and extensions from one town to another. In addition, eight roads have been reported as expecting to spend more than \$1,250,000 in extensions, while six others expect to construct 27 miles of new track and four roads expect to reconstruct 8½ miles. In Texas there are three propositions under consideration for the con-

struction of lines for distances of 185 miles, 180 miles and 65 miles, while in Tennessee there is one considered for 50 miles in length. One traction company expects to replace trolley wire on 36 miles of its line or install steel auxiliary wire under its present trolley wire. Also, 10,000 ties are to be replaced by this company. Another company is reported as expecting to purchase 40,300 ft. of feeder cable in three different sizes. A third company reports it will purchase 2 miles of No. 00 wire and still another company is in the market for 6000 ft. of 250,000 circ.mil cable.

More than \$3,600,000 worth of buildings are planned for this year by twelve companies. These include power houses, shops, terminal stations and other buildings. For some of these projects contracts have been let, for others bonds have been authorized by municipalities. Outside of this figure many other plans have been authorized and considered for the same type of buildings, substations, automatic substations, transformers, motor-generator sets, boilers and generators up to 20,000 hp. size.

Taken all in all, the year to date has begun to show signs of some awakening, and it seems reasonable to believe that the energy of manufacturers and manufacturers' agents will turn the plans into orders.

### New Heating Combination

A combination has just been made between Holden & White, Inc., of Chicago, and Walter E. Hinman and Osborne E. Quinton, of Detroit, by which they become associated and Holden & White, Inc., will market a complete line of hot-air and hot-water stoves and auxiliary apparatus for electric cars and thermostatic control for electric heaters.

The stoves are being made by the Detroit Stove Works, one of the largest manufacturers of stoves in the world. They will be known as the Jewell electric railway stoves, and will embody several novel features, including the hot-blast principle of the Detroit Stove Works, by which the thermal efficiency of these stoves per unit of fuel is increased. They are arranged to burn almost any fuel, such as hard or soft coal, lump coal, coke or wood. The hot-air stove will have its motor at the bottom of the stove so that it will not be subjected to the heat and thus

the maintenance should be low. A number of the new Jewell heating systems have been installed on electric railways and the results are reported as satisfactory. The Jewell hot-water stoves will use the coil principle for heating the circulating water.

## Better Tone in Transformer Market

### Prices on Large Equipment Expected to Remain Firm for Remainder of Year

Although the demand for transformers is far below normal, a better tone is apparent in the market. Two or three weeks ago buying reached perhaps the lowest point since the armistice began. Price reductions of the order of 10 per cent on larger transformers were quoted about that time, and a logical reaction can be seen in the increased number of inquiries now coming in. Business is still dull in comparison with the outputs and sales of a few months ago, but the outlook cannot be called discouraging, to say the least.

As soon as central station development becomes freer the transformer market will respond quickly to the stimulus. The high cost of financing extensions of plant in respect to both money rates and the abnormal cost of apparatus has held back the growth of systems normally to be counted upon. Some signs of improvement are now noted by the transformer manufacturers. Raw material and labor are plentiful; factory stocks are in excellent shape for exceedingly prompt delivery of sizes ordinarily specified for distribution work, and in the larger units, say from 200 kv.-a. upward, deliveries can be made in about one-fourth the time required last summer on orders carrying anything less than very high priority ratings. Virtually any commercial requirement in large units can now be met in from sixty to ninety days.

The price situation is of interest. The point is emphasized that electrical equipment of the transformer class was advanced only about 60 per cent in price during the war, compared with advances of from 100 to 300 per cent in many other manufactured products. The price of labor appears likely to continue high; much material purchased at high prices is at hand to be worked up before lower cost material will be available, and with the exception of copper very little reduction has taken place in the cost of supplies entering into



transformer construction. The high-grade steel and insulation needed show little or no tendency to weaken in cost.

It is well to remember that transformer prices per kilowatt of capacity have long compared very favorably indeed with other equipment built to deliver energy efficiently in bulk. It is to be doubted whether transformer prices will go back to a point 30 or 40 per cent above pre-war levels in any future which can be apprehended now.

### Consolidation of English Manufacturers

It is announced that about 90 per cent of the stockholders of Dick, Kerr & Company, Ltd., have accepted the offer made to them by the English Electric Company, Ltd., under which this company will have the predominating control of the Coventry Ordnance Works, Ltd., Dick, Kerr & Company, Ltd., Phoenix Dynamo Manufacturing Company, Ltd., United Electric Car Company, Ltd., and Williams & Robinson, Ltd. The company is registered with a capital of \$5,000,000, in £1,500,000 preferred and £3,500,000 ordinary shares. It is the intention to interfere as little as possible with the internal organization of the respective works, but the company will take over the whole of the external business management, and with certain exceptions, such as the civil engineering and contracting department of Dick, Kerr, and certain special parts of the Coventry Works, will conduct all selling and other negotiations with the public.

### Rolling Stock

Kansas City, Lawrence & Topeka Railroad, Kansas City, Mo., is reported in the market for material to repair cars.

Jackson Railway & Light Company, Jackson, Tenn., lost its carhouse, seven cars and two trailers by fire. The loss on the building is reported as \$5,000.

Pacific Electric Railway, Los Angeles, Calif., has received the twenty safety cars which are reported for use on runs in Pomona, San Bernardino, Riverside, Pasadena and Santa Monica, and not on Los Angeles city lines. The order for these cars was noted in these columns on June 15, 1918.

### Track and Roadway

Municipal Railway of San Francisco, San Francisco, Cal.—Plans are being made for the extension of the F route line of the Municipal Railway of San Francisco into the Presidio reservation so that it will end at the proposed new headquarters building and an extension to Fort Scott.

Ocean Shore Railroad, San Francisco, Cal.—It is reported that plans are being made by the Ocean Shore Railroad for building an extension from the present terminal at Tunitas Glen to Pescadero.

City & Suburban Railway, Brunswick, Ga.—It is reported the City & Suburban Railway will extend its line to the Atlantic Refinery Company.

New Orleans, La.—At the convention recently held at Bay St. Louis, Miss., to arrange plans for the construction of a municipally-owned electric interurban railway to connect New Orleans, La., and Mobile, Ala., with all of the Mississippi Coast towns, an executive committee was appointed to work out a plan allotting the cost of construction among the municipalities and to secure estimates from engineering firms. Mayor John J. Kennedy of Biloxi, Miss., was made chairman of the executive committee, with Mayor Frank Suter, Pass Christian, Miss., as secretary. The convention adopted a tentative route for the proposed municipal interurban railway, the line beginning at New Orleans and running via Slidell, Waveland, Bay St. Louis, Pass Christian, Long Beach, Gulfport, Handsboro, Biloxi, Ocean Springs, Pascagoula, Moss Point, Grand Bay and Mobile. [Feb. 1, '19.]

Jackson Light & Traction Company, Jackson, Miss.—Substantial repairs and improvements will be made in the company's property. It is roughly estimated that more than \$100,000 will be expended to put the property in shape.

Public Service Railway, Newark, N. J.—Announcement has been made by the Public Service Railway Company that it will spend about \$100,000 in the reconstruction of its tracks on Federal Street, between the Pennsylvania terminal and Broadway. The work is now under way. Over 7800 ft. of track is to be relaid, 101-lb. rail being used to replace the 90-lb. rail. The heavy construction is made necessary by the increased traffic.

### NEW YORK METAL MARKET PRICES

	Feb. 27	Mar. 13
Copper, ingots, cents per lb.....	15.25	14.75
Copper wire base, cents per lb.....	18.75 to 19.00	17.25 to 18.00
Lead, cents per lb.....	5.25	5.25
Nickel, cents per lb.....	40	40.00
Spelter, cents per lb.....	6.65	6.50
Tin, cents per lb.....	172.50	172.50
Aluminum, 98 to 99 per cent., cents per lb.....	31.50	30.00

† Government price in 25-ton lots or more f. o. b. plant.

### OLD METAL PRICES—NEW YORK

	Feb. 27	Mar. 13
Heavy copper, cents per lb.....	13.00 to 13.50	12.75 to 13.25
Light copper, cents per lb.....	11.00 to 11.25	10.75 to 11.00
Heavy brass, cents per lb.....	7.50 to 7.75	7.25 to 7.50
Zinc, cents per lb.....	5.25 to 5.50	5.25 to 5.50
Yellow brass, cents per lb.....	6.00 to 6.50	6.00 to 6.25
Lead, heavy, cents per lb.....	4.75 to 4.87	4.75 to 4.87
Steel car axles, Chicago, per net ton.....	\$28.00 to \$30.00	\$28.00 to \$30.00
Old carwheels, Chicago, per gross ton.....	\$22.00 to \$23.00	\$22.00 to \$23.00
Steel rails (scrap), Chicago, per gross ton.....	\$15.50 to \$16.50	\$16.50 to \$17.00
Steel rails (relaying), Chicago, gross ton.....	\$15.50 to \$16.50	\$15.50 to \$16.00
Machine shop turnings, Chicago, net ton.....	\$5.50 to \$6.00	\$5.50 to \$6.00

### ELECTRIC RAILWAY MATERIAL PRICES

	Feb. 27	Mar. 13
Rubber-covered wire base, New York, cents per lb.....	23	21
Weatherproof wire (100 lb. lots), cents per lb., New York.....	28.75 to 33.75	25.75 to 33.75
Weatherproof wire (100 lb. lots), cents per lb., Chicago.....	30.75 to 35.75	30.75 to 37.35
T rails (A. S. C. E. standard), per gross ton.....	\$60.00 to \$65.00	\$60.00 to \$65.00
T rails (A. S. C. E. standard), 100 to 500 ton lots, per gross ton.....	\$57.00 to \$60.00	\$57.00 to \$60.00
T rails (A. S. C. E. standard), 500 ton lots, per gross ton.....	\$55.00 to \$60.00	\$55.00 to \$60.00
T rail, high (Shanghai), cents per lb.....	3 1/2	3 1/2
Rails, girder (grooved), cents per lb.....	4 1/2	4 1/2
Wire nails, Pittsburgh, cents per lb.....	3 1/2	3 1/2
Railroad spikes, drive, Pittsburgh base, cents per lb.....	3.90	3.65
Railroad spikes, screw, Pittsburgh base, cents per lb.....	8	8
Tie plates (flat type), cents per lb.....	3	3
Tie plates (brace type), cents per lb.....	3	3
Tie rods, Pittsburgh base, cents per lb.....	7	7
Fish plates, cents per lb.....	3	3
Angle plates, cents per lb.....	3	3
Angle bars, cents per lb.....	3	3
Rail bolts and nuts, Pittsburgh base, cents per lb.....	4.90	4.90
Steel bars, Pittsburgh, cents per lb.....	2.70	2.70
Sheet iron, black (24 gage), Pittsburgh, cents per lb.....	4.55	4.55
Sheet iron, galvanized (24 gage), Pittsburgh, cents per lb.....	5.60	5.60
Galvanized barbed wire, Pittsburgh, cents per lb.....	4.35	4.35

	Feb. 27	Mar. 13
Galvanized wire, ordinary, Pittsburgh, cents per lb.....	3.95	3.95
Car window glass (single strength), first three brackets, A quality, New York, discount.....	77%	77%
Car window glass (single strength, first three brackets, B quality), New York, discount.....	77%	77%
Car window glass (double strength, all sizes AA quality), New York discount.....	79%	79%
Waste, wool (according to grade), cents per lb.....	13 to 20	13 to 20
Waste cotton (100 lb. bale) cents per lb.....	11 to 13	11 to 13
Asphalt, hot (150 tons minimum) per ton delivered.....		
Asphalt, cold (150 tons minimum, pkgs. weighed in, F. O. B. plant, Maurer, N. J.), per ton.....	\$43.00	
Asphalt filler, per ton.....	\$45.00	\$30.00
Cement (carload lots), New York, per bbl.....	\$3.20	\$3.20
Cement (carload lots), Chicago, per bbl.....	\$3.34	\$3.34
Cement (carload lots), Seattle, per bbl.....	\$3.68	\$3.68
Linseed oil (raw, 5 bbl. lots), New York, per gal.....	\$1.48	\$1.53
Linseed oil (boiled, 5 bbl. lots), New York, per gal.....	\$1.55	\$1.60
White lead (100 lb. keg), New York, cents per lb.....	13	13
Turpentine (bbl. lots), New York, cents per gal.....	70 to 71	69 1/2

† These prices are f. o. b. works, with boxing charges extra.



**Trenton & Mercer County Traction Corporation, Trenton, N. J.**—The Trenton City Commission has asked the Trenton & Mercer County Traction Corporation to lay new track on West State Street, from Willow to Calhoun Streets. The present track has sunk below the surface of the brick pavement.

**Brooklyn (N. Y.) Rapid Transit Company.**—Announcement has been made by the Brooklyn Rapid Transit Company that the Culver elevated line in Brooklyn will be placed in operation on Mar. 16. For the present the terminus of the line will be at Kings Highway. Within a few weeks it is expected to extend the operation to Avenue U and later to Coney Island, which will be its final terminus.

**Columbus Railway, Power & Light Company, Columbus, Ohio.**—In connection with street improvements being made by the city, the Columbus Railway, Power & Light Company will construct 6.75 miles of single track.

**Oklahoma Union Railway, Tulsa, Okla.**—Announcement has been made in Tulsa that the Oklahoma Union Railway has just completed a survey from Keifer to Okmulgee, via Mounds and Beggs and will build the extension to the Okmulgee county metropolis this year. This company also contemplates the construction of a line from Tulsa northward to Nowata, via Collinsville.

**Philadelphia, Pa.**—Sealed proposals will be received by William S. Twining, Director Department of City Transit, until March 25 for the construction of 68 column foundations of concrete in Front Street from above Arch Street to Callowhill Street, Frankford Elevated Railway, contract No. 500. Plans and specifications may be obtained at the office of the Department, Merzhon Building, upon deposit of \$10, which will be refunded upon return of the plans.

### Power Houses, Shops and Buildings

**Kansas City, Lawrence & Topeka Railroad, Kansas City, Mo.**—The carhouse of the Kansas City, Lawrence & Topeka Railroad, which was destroyed by fire, will be rebuilt at a cost of \$3,000.

**Ohio Service Company, Coshocton, Ohio.**—The Ohio Service Company is installing an additional 4000-kw. at its plant in New Philadelphia and is contemplating the installation of a new switchboard at its Dennison substation, and also the erection of a parallel circuit of 33,000-volt transmission lines from New Philadelphia to Dennison and from Newcomerstown to Cambridge.

**Pacific Power & Light Company, Astoria, Ore.**—Plans have been made by the Pacific Power & Light Company for the erection of a new power plant on the grounds adjoining its existing plant at Astoria. The capacity of the proposed plant will be 4500 hp.

**American Railways, Philadelphia, Pa.**—Arrangements have been completed by the American Railways for the installation of new boiler equipment at Keyport.

**Jackson Railway & Light Company, Jackson, Tenn.**—The carhouse of the Jackson Railway & Light Company, together with seven cars and two trailers, was recently destroyed by fire. Plans are being made for the reconstruction of the building.

### Trade Notes

**Standard Underground Cable Company, Pittsburgh, Pa.**, announces the appointment of Robert T. Lozier as special representative.

**Belden Manufacturing Company, Chicago, Ill.**, manufacturer of wire and cable, it is reported, has increased its capital from \$1,000,000 to \$1,500,000.

**Chicago Pneumatic Tool Company** announces the removal on March 1 of its Cleveland district office from room 813 to rooms 406-408 Engineers' Building.

**Captain Neale, Civil Engineer-in-Chief's Department, Room 1004, Admiralty, London, S. W. I.**, desires catalogs from manufacturers of electric railway equipment for purpose of reference.

**Smith-Ward Brake Company, Brooklyn, N. Y.**, reports that B. B. Ringo, who was commissioned as ensign in the engineering corps of the Navy at the outbreak of the war, has returned to his former duties with the company. He is now general manager and assistant treasurer of the company.

**Edward A. Miller** has been appointed assistant superintendent of the Jersey City plant of the Metal & Thermit Corporation, New York, N. Y. Mr. Miller was one of the pioneers in autogenous welding and cutting, having established the first oxyacetylene shop in New York City early in 1908 under the corporate form of the Acetylene Welding Company. Among his notable jobs in the past have been the removal of the abandoned sheet metal piling encountered under the pneumatic foundations of Dry Dock No. 4 in the Brooklyn Navy Yard in 1910 and 1911 and the demolition of the ruins of the old Equitable Building in New York City in 1912.

**J. G. Brill Company**, according to press reports, is working its factory about 90 per cent capacity. Most of the direct government contracts for work outside of the company's regular line have been completed. But it is still working on a good many orders for cars for concerns such as the Emergency Fleet Corporation and others indirectly connected with government undertakings. There are some inquiries in the market which suggest interest being taken by street railways in the matter of new equipment, but costs have so far not lowered much. The \$8,200,000 business on the books of the Brill company is sufficient to keep it busy for the next six months.

**Capt. George Sykes, R. A. F., A. M. I. E. E.**, who has been in the United States nearly four years, attached to the British War Mission in a commercial capacity, sails for Europe in May. He has joined Messrs. Dutilh-Smith McMillan Company, an international house, as London manager of its engineering and railroad departments. For many years prior to the war Captain Sykes was connected with electrical manufacturers in the sales and engineering departments and with power and traction corporations. He will be glad to hear from firms wishing to introduce electric railway equipment in Europe. His New York address is 50 Broad Street and his London Office is Central Building, Tottenham Street, Westminster.

**Meachem Gear Corporation, Syracuse, N. Y.**, with offices at 411 Canal Street, has been incorporated for the purpose of taking over from the New Process Gear Corporation the manufacture of New Process rawhide pinions and for the general manufacture of gears of all kinds. The company is incorporated for \$300,000 and has purchased a three-story building which is to be devoted entirely to the manufacture of gears. The Meachems organizing this company are the same who owned and controlled the New Process Gear Corporation and the New Process Rawhide Company for a period of thirty years, and associated with them are George W. Wood, secretary and superintendent, and H. W. Kiddle, assistant superintendent, who had charge of the manufacture of rawhide and the rawhide pinion department of the old company. The plant purchased is now being remodeled and was to begin operations on March 1, at which time it takes over the rawhide pinion business, the hide plant at 811 Free Street, Syracuse, and all of the raw materials and uncompleted orders pertaining to this branch of the business.

### New Advertising Literature

**Strauss Bascul Bridge Company, Inc., Chicago, Ill.**: A 70-page illustrated bulletin of trunnion, bascule and direct-life bridges.

**Cokal Stoker Manufacturing Company, 48 West Division Street, Chicago, Ill.**: Two folders on "Cokal" hand-operated stokers.

**Smith-Sewell Company, 90 West Street, New York City**: Bulletin No. 26 on the construction, uses and operation of Francke flexible couplings of the heavy pattern type.

**Blaw-Knox Company**: Small booklet descriptive of the fabricated steel plate work, transmission towers, steel forms for concrete construction and other products of the company.

**Cutter Company, Philadelphia, Pa.**: A circular noting the growth of the company's circuit-breaker business in twenty years. Illustrations of two styles of this company's apparatus accompany the circular.



# Peacock Brakes from Coast to Coast



## San Francisco has many reasons for using Peacocks

Listen to what the Master Mechanic of the United Railways of San Francisco, said about operating conditions in that city:

"Probably no other city in the United States," he said, "needed a light car so much as San Francisco, for on account of *our many grades*, the average energy consumption per car-mile greatly exceeds that of other cities."

The italics are ours. They explain why Peacock Brakes to the number of 681 have been installed since the company decided to make the cars "safer and cheaper to operate."

Peacock Brakes insure SAFETY on the grades and ECONOMY when it comes to avoiding turn-ins due to brake repairs.

*Next Stop*—PORTLAND

**National Brake Co.**  
Buffalo, N. Y.



# Bankers and Engineers

## Ford, Bacon & Davis, Engineers.

115 BROADWAY

New Orleans

NEW YORK

San Francisco

## THE J. G. WHITE COMPANIES

ENGINEERS  
FINANCIERSCONTRACTORS  
OPERATORS43 EXCHANGE PLACE  
LONDONNEW YORK  
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Industrial Plants and Buildings, Steam Power Stations, Water  
Power Developments, Substations, Gas Plants, Transmission  
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OPERATING AND RATE INVESTIGATIONS  
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REPORTS, DESIGNS, CONSTRUCTION, MANAGEMENT  
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RAILWAY, LIGHT and POWER PROPERTIES

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## A. L. DRUM & COMPANY CONSULTING AND CONSTRUCTING ENGINEERS

VALUATIONS AND FINANCIAL REPORTS  
CONSTRUCTION AND MANAGEMENT  
OF ELECTRIC RAILWAYS

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## ALBERT S. RICHEY ELECTRIC RAILWAY ENGINEER

WORCESTER POLYTECHNIC INSTITUTE  
WORCESTER, MASSACHUSETTS

## WOODMANSEE & DAVIDSON ENGINEERING CO.

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Examination and reports Utility Securities Bought and Sold

## ENGELHARDT W. HOLST Engineer

Reports, Appraisals, Reorganizations

683 Atlantic Ave., Boston, Mass.

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DETECTIVES

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Park Row Bldg., New York Board of Trade Bldg., Boston

When writing the advertiser for information or  
prices, a mention of the Electric Railway  
Journal would be appreciated.ELECTRICAL TESTING LABORATORIES  
Electrical, Photometrical and  
Mechanical Testing.

80th Street and East End Ave., New York, N. Y.

Scofield Engineering Co. Consulting Engineers  
PHILADELPHIA, PA.  
POWER STATIONS  
GAS WORKS  
HYDRAULIC DEVELOPMENTS  
ELECTRIC RAILWAYS



# CROWN Rail Bonds

Made by  
**American Steel & Wire Company**

Chicago  
New York  
Cleveland  
Pittsburgh  
Denver  
U. S. Steel Products Co.

11000 volt Catenary—Pennsylvania Railroad—Main Line  
Philadelphia—Paoli Electrification

Showing installation of Crown  
Rail Bonds—Two 1.9 bonds per  
joint—Each bond has separate  
socket terminal soldered to stub  
end after threading beneath and  
without removing the splice bars.






Please enter our subscription for the McGraw Electric Railway List for  
 1919—February and August—at \$7.00 per year (\$4 for a single  
 number.)

Hill Company, Inc.  
 36th St. at 10th Ave., New York

Company .....  
 Address .....  
 Signed by .....  
 Position .....



# Welding



Because of the Government's war requirements, we increased our welding capacity to such an extent that today we are one of the largest users of both the electric and oxy-acetylene processes, as applied to plate work, in the United States.

We solicit your inquiries for welded (also pressed and riveted) steel plate products of every description, including: accumulators, agitators, water boshes, annealing boxes, containers, digesters, filters, gear guards, kettles, ladles, pans, penstocks, air receivers, stacks, standpipes, miscellaneous tanks, miscellaneous blast furnace work, etc.

*We specialize in the conversion of troublesome castings and riveted work into the more satisfactory and efficient welded structure.*

## BLAW-KNOX COMPANY

605 Farmers' Bank Bldg., Pittsburgh, Pa.

New York, 165 Broadway

Chicago, Peoples Gas Bldg.

San Francisco, 630 Monadnock Bldg.

Sheffield, Eng.

Foreign Sales Representatives

Gaston, Williams &

Wigmore, Inc.,

39 Broadway,

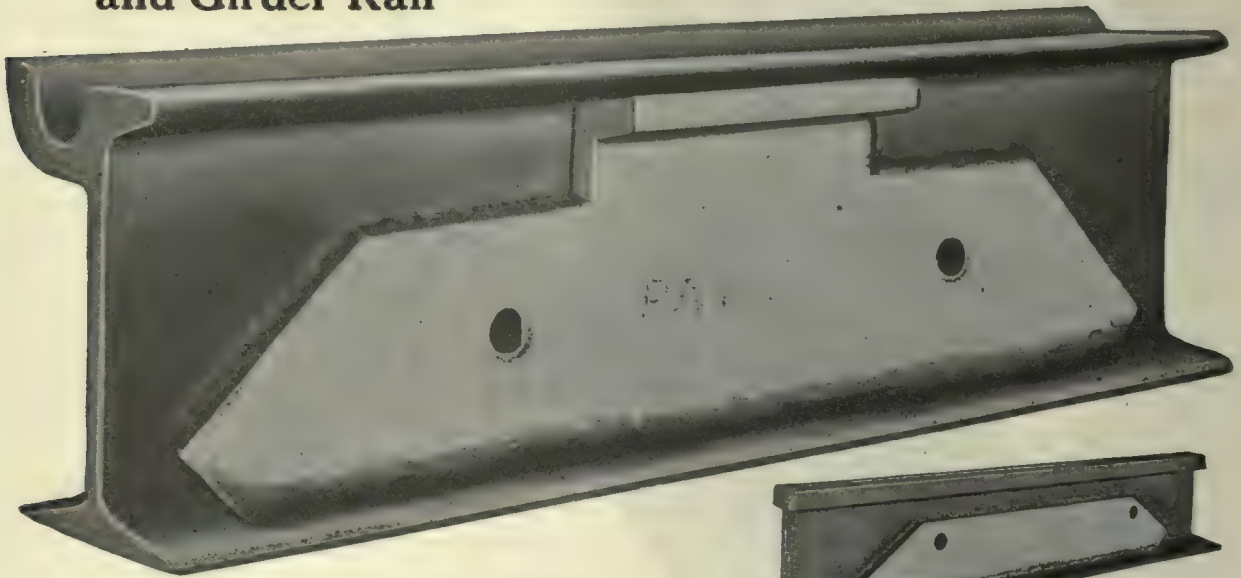
New York City





# Why are Over 100 Electric Railways Using These Joints?

**"Apex" Joint for Guard and Girder Rail**



**Because they mean**

**Less Time and Money to Install — and Greater Strength and Conductivity**

Why spend time and money to repair broken track or to bolt on joints that eventually shake loose—when for no greater investment you can install joints that show greater strength and conductivity than new, unbroken rails? A deflection test of the APEX Joint, made by Robert W. Hunt & Co. of Chicago, showed under maximum wheel load (entirely suspended) a deflection of but .018 in. Permanent set .000 in. A test of the SIMPLEX Joint, made by the Bureau of Standards, Washington, D. C., showed the conductivity of this joint as 138 against 100 on unbroken rail.

You will be glad to know that the PRICE of this Joint material, and of Indianapolis Welders is still remarkably low, and our stock guarantees prompt deliveries.

*If contemplating any new work—get our figures on Solid Manganese Crossings.*

**Indianapolis Switch & Frog Company, Springfield, Ohio**

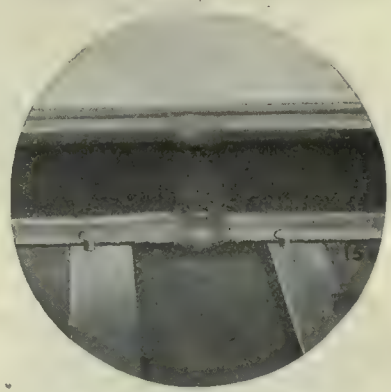
*Users of Indianapolis Patented Welders, Joints and Welding Supplies Fully Protected.*





Bowery, Between Chatham Square and Bayard St.

### Obliterates the Rail Joint



Finished Thermit fully welded  
Insert Rail Joint

# Thermit Insert Welds 4 Years Under Heavy Traffic — No Breaks —

## Other Thermit Uses

*Making up special work. Welding compromise joints. Repairing broken motor cases and car truck frames. Rendering the Electric Railways independent of any shortage of new steel products.*

Four years ago all rail joints on the Third Avenue Railway System were *obliterated* by the Thermit Insert Weld Process.

Since then—in spite of continuously heavy traffic—in spite of the terribly severe winter of 1917-18 with its months of zero weather—no breaks have occurred.

This is only one instance of Thermit Insert Weld efficiency. These welds not only insure a smooth, continuous track, but a track that *stays* smooth and stays continuous during the entire life of the rail. The Thermit Insert Weld Process is the only process whereby you can repair a not-too-battered rail joint without inserting a new piece of rail. Send for Catalog No. 12—or a personal representative.

## METAL & THERMIT CORPORATION

Successors to Goldschmidt Detinning Co. and the Goldschmidt Thermit Co.  
120 BROADWAY, NEW YORK

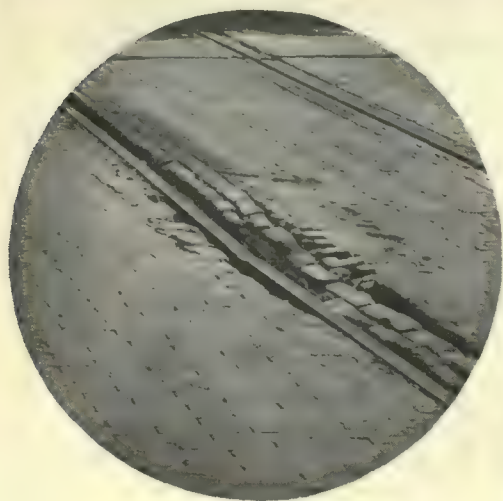
329-333 Folsom St., San Francisco. 15 Emily St., W., Toronto, Ont. 7300 So. Clinton Ave., Chicago.  
1427-1429 Western Ave., Pittsburgh, Pa.  
Factories located at Chrome, N. J.; Wyandotte, Mich.; East Chicago, Ind.; Jersey City, N. J.



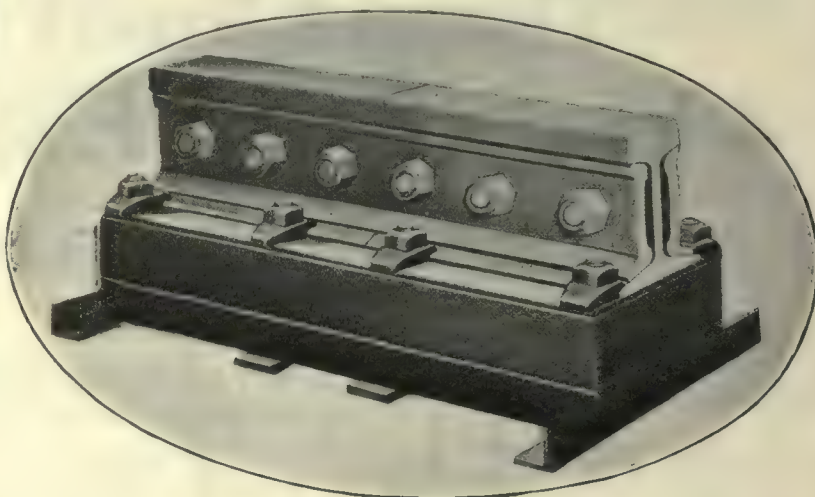


## What's the Answer?

Here is a "terrible example" of joint failure. The rails are low and uneven. It looks *hopeless*. What's the answer to the question of how to rehabilitate that joint quickly and at lowest cost?



The Answer Is  
to Install  
the Efficient



## Dayton Rail Joint Booster

With this Joint Booster low joints are repaired and rail ends brought to surface quickly with comparatively small cost and without in any way interrupting car operations. Their installation is simple.

The Dayton Rail Joint Booster is an adaptation of the Dayton Mechanical Tie. Consists of a white oak block 24 inches long, 10 inches wide and 5 inches

high embedded in a ½-inch cushion of asphalt and supported by angles. The top of the block is covered by a ¼-inch steel plate, on which the rail rests. Eight bolts with rail clips pass through angle plate and block and are anchored in metal strips which extend beyond the block and provide an additional means for anchoring the joint booster in the concrete.



THE DAYTON MECHANICAL TIE CO.

201 Third Street Arcade

DAYTON, OHIO





# Getting Down to Bedrock!

Burdens, grievous ones, have fallen on the industry as a result of the war. But the old saying "Tis an ill wind that blows no one good" is still true. The war has forced us to get down to bedrock at the roots of our problems in many instances. It has taught us that we can save in many ways that we before had not dreamed possible. It has torn away some of the old traditions

Investigate the Savings  
made possible by

## IRVINGTON Insulation

There may be many ways that Irvington Insulation Products can save you money—ways in which you before had not fully considered or deemed possible.

Perhaps a little bit better grade of oiled silk or flexible varnished tubing or coil-winding paper may be just exactly what is needed to stop a power loss that is draining away money all unsuspected.

*We can furnish that better grade of insulating product. The reputation made by Irvington Black (and Yellow) Varnished Cambric will be amply sustained by the balance of our products. They insure high resistance, high dielectric strength, non-hygroscopic and heat resisting qualities, as well as neutrality to chemical action.*



**IRVINGTON VARNISH & INSULATOR CO.**  
**Irvington, New Jersey.**

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# Columbia Tools on the Job for You!

## Turning Out Bearings



You will understand the perfection of Columbia-made products when we tell you that we have several hundred machine tools alone.

Practically each tool, be it drill, shaper, borer, grinder, planer or lathe, is handled by the same man day in, day out.

Such specification inevitably results in turning out the best possible work.

That's only one of the many reasons for using Columbia-made products.

## Columbia Machine Works & Malleable Iron Co.

Atlantic Avenue and Chestnut Street, Brooklyn, N. Y.

### TOOLS

Armature and axle straighteners  
Armature shaft straighteners  
Armature buggies and stands  
Babbiting molds  
Banding and heading machines  
Car hoists  
Car replacers  
Coil taping machines for armature leads  
Coil winding machines  
Pinion pullers  
Pit jacks  
Signal or target switches  
Tension stands

W. R. Kerschner Co., Inc., N. Y.  
Holden & White, Inc., Chicago  
F. F. Bodler, San Francisco  
Railway & Power Eng. Corp., Ltd., Toronto, Can.



### CAR EQUIPMENT

Armature and axle bearings  
Armature and field coils  
Bearings (Axle and Armature)  
Brush-holders and brush-holder springs  
Brake, door and other handles  
Brake forgings, riggings, etc.  
Car trimmings  
Commutators  
Controller handles  
Forgings of all kinds  
Gear cases (steel or malleable iron)  
Grid resistors  
Third-rail shoe beams and accessories  
Trolley poles (steel) and wheels





## “INTERNATIONALS” On All Washington Cars

After a thorough consideration of their particular fare collection needs the Capital Traction Co. and the Washington Railway and Electric Co. of Washington, D. C., ordered International C-15 Coin Registers and Type C-16 Fare Boxes for their cars.

The C-15 Coin Register will be used on the “long run” cars and the C-16 Fare Box on the “short run” cars where it is necessary to have the fare collecting equipment easily movable from one end of the car to the other.

The fact that the use of International Equipment facilitates the handling of large crowds without confusion and consequent schedule delays assures registration of every paid in fare and makes the conductor's work easier and more efficient had much influence in its selection.

Take advantage of our varied experience with the problems of fare collection and with the development of Fare Collecting Devices. Put your problems up to us.

**The International Register Co.**  
15 Throop Street, Chicago



C-15  
Coin  
Register



Type C-16,  
Fare Box



# ECONOMY IN REPLACEMENTS

IT'S THE CONSTANT "LITTLE REPAIRS" THAT BUILD UP BIG MAINTENANCE COSTS

If you will check up on the cost of the work that is being done along your line—not the big replacement and new construction work—but just the little jobs replacing a few rotted crossarms, or a few decayed ties, or a bit of fencing, you will probably be surprised to find how much these items total in the course of a year.

Of course you are never going to get away from *all* of this sort of expense, but you can eliminate a surprisingly heavy proportion of it by using

## CYPRESS

"THE WOOD ETERNAL"

not only on new construction, but on all replacement work.

ALL-HEART CYPRESS comes the nearest to being "decay-proof" of any lumber suitable for railway use.

Several of the largest railway companies in the country have found the use of cypress a paying investment.

THEY'VE LEARNED TO INSIST ON SEEING THIS MARK ON EVERY BOARD AND ON EVERY BUNDLE.



The data that substantiates this fact will be promptly furnished, if you ask for it.

## SOUTHERN CYPRESS MFRS' ASS'N

1265 Hibernia Bank Building, New Orleans, La., or  
1265 Heard National Bank Building, Jacksonville, Fla.

## Metal Tickets

for

Fare Register



Enlarged to 1½ times actual size

Nickel-Silver  
Bronze or Brass

Designs developed according to your ideas and subject to your approval. We make the metal, the dies and the tickets.

We have the experience, the equipment, the capacity for rapid quantity production.

*Information on request.*

**Scovill Mfg. Co.**

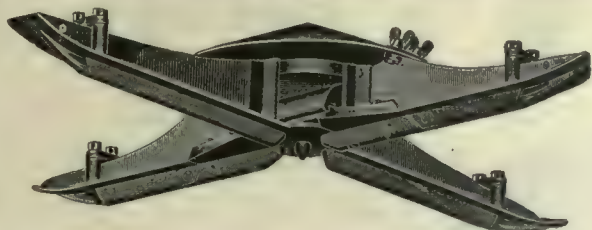
*Established 1802*

Waterbury, Conn.

New York  
Chicago

Boston  
Detroit





## A lighter, better insulated crossing

Quickly and easily installed, stronger, lighter by 25%, made of the best homogeneous sheet steel and has renewable insulated runways—all points worth considering when ordering material for rehabilitation.

Two Items from the Anderson Line—Write for Catalog No. 8



## A strain that cuts time in half

The ingenious double take-up of this Strain does the work in just one-half the time required by other designs. Any saving of time is real economy; and the SAVING represented by such economy is imperative to every electric railway line today.

## Albert & J. M. Anderson Mfg. Co.

289-293 A Street

(Established 1877)

Boston, Mass., U. S. A.

### BRANCHES:

New York, 135 Broadway  
Chicago, 105 So. Dearborn Street  
Philadelphia, 429 Real Estate Trust Bldg.  
London, E. C., 48 Milton Street



Now is the time to put in that long-neglected repair and maintenance work—and use the



## ERICO Portable Welding Rheostat

The War showed the Electric Railways how they could get along with almost practical suspension of maintenance. But the time has come to rejuvenate equipment—and to do it for the least cost in time and money.

There is still service in many of the old armature shafts, flat wheels, gears and other important parts if they are re-

claimed by the Erico Portable Welding Rheostat.

This outfit is a time, money, labor and equipment saver in the shop, an excellent bonding outfit when used in connection with the Erico Portable Bonder.

Its exceptionally light weight, portability and large voltage range have appealed to many users.

The Electric Railway Improvement Co., Cleveland



You are assured

Minimum  
Cost



Maximum  
Mileage

**F. C. S. WHEELS**

*For Street and Interurban Railways*

**GRIFFIN WHEEL COMPANY**

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St. Paul

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Main Office: McCormick Building, Chicago, Ill.

## When You Next Buy Tool Steel

The thought uppermost in the mind of the purchaser should include the two words Quality and Service. Materials for

## Carnegie Tool Steels

are selected and carefully treated during manufacture to insure and maintain a high quality.

The endeavor of this company at all times is to meet every requirement of its trade. Carnegie service goes with all its products.

**On the basis of experience this company recommends for tools its carbon steels made in the electric furnace.**

Carbon steels properly made and properly treated will serve the requirements of the tool maker for most purposes as well as more expensive alloy steels.

Tool steels are marketed through Carnegie Warehouses.

Quotations and literature can be had from any Carnegie Office.

Send for the pamphlet—Tool Steels.

**Carnegie Steel Company**

464 Frick Building Annex, Pittsburgh, Pa.



# "STANDARD"

Steel Tires                      Steel Tired Wheels  
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                                  Forged and Rolled Steel  
                                  Pipe Flanges  
 Ring Dies                      Rings                      Roll Shells  
                                  Steel Springs



*"The 'Standard' Brand on your material  
 is an assurance of eventual economy."*



## STANDARD STEEL WORKS CO.

GENERAL OFFICES:

MORRIS BUILDING, PHILADELPHIA, PA.

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 HAVANA, CUBA

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 NEW YORK  
 MONTEREY, MEX.

MEXICO CITY  
 LONDON, ENGLAND  
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## WHICH GETS THE BEST PRICE ?



### ONE BID                      OR MANY

One bidder  
 usually  
 buys  
 at a sale price.

:

A number of bidders  
 enables the seller  
 to get  
 full market value.

When you have Second Hand Equipment to sell you want *all* the bidders possible.

Advertising secures more bidders.

An advertisement in *one* issue may make a sale possible but—to sell at the *best* price you must have a choice among a *number* of buyers.

A *number* of insertions will get them for you.

**BE SURE**—advertise your equipment until it is sold. Advertise it in the **SEARCHLIGHT SECTION** to get the **most** bidders.



# MARSH & MCLENNAN FIRE INSURANCE

Special Attention Given to Traction Insurance

Insurance Exchange, CHICAGO

19 Cedar St. NEW YORK    1615 California St. DENVER    314 Superior St. DULUTH    300 Nicollet Ave. MINNEAPOLIS    Ford Bldg. DETROIT    17 St. John St. MONTREAL    23 Leadenhall LONDON

THESE OFFICES WILL GIVE YOU THE BEST THERE IS IN INSURANCE SERVICE



WEATHERPROOF WIRE  
AND CABLE  
PAPER INSULATED  
UNDERGROUND CABLE  
(Single, Duplex and Three Phase)  
TROLLEY WIRE  
(Round, Grooved or Figure 8)  
BARE COPPER WIRES AND  
CABLES  
MAGNET WIRE  
(Cotton or Asbestos)

Americanite Rubber Covered Wire  
Incandescent Lamp Cord

Galvanized Iron and Steel  
Wire and Strand

**AMERICAN ELECTRICAL WORKS**

Phillipsdale, R. I.

Boston, 176 Federal; Chicago, 112 W. Adams; Cincinnati, Traction Bldg.;  
New York, 233 B'way; San Francisco, 612 Howard; Seattle, 100 1st Ave. So.

## SPECIAL STANDARD BRONZE

(S. S. B.)

### High Strength Trolley Wire

is unexcelled for durability, reliability  
and economy. Samples and prices on  
request.

**STANDARD UNDERGROUND CABLE CO.**  
PITTSBURGH, PA.

Branches in all principal cities

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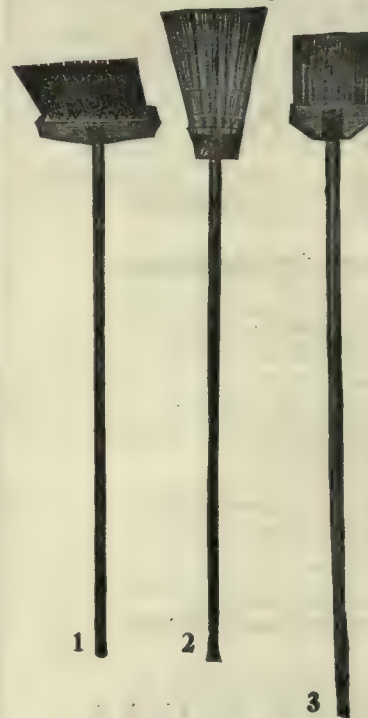
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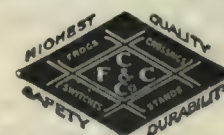


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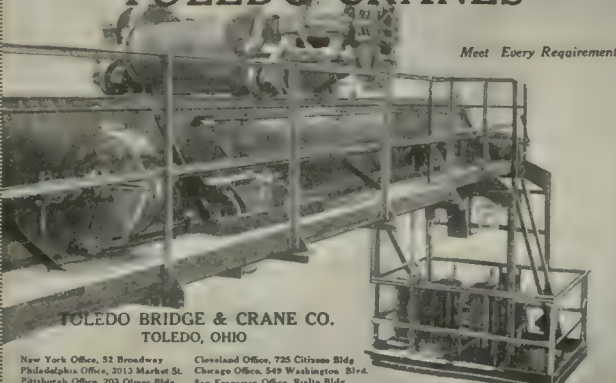
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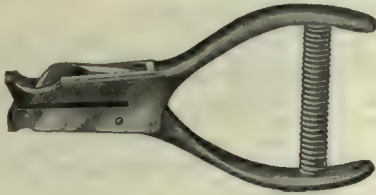
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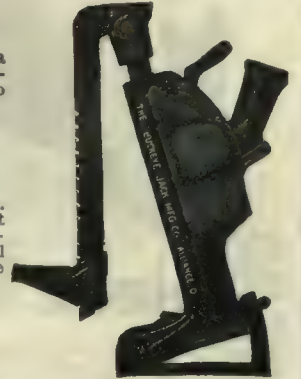
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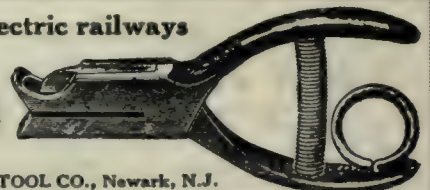
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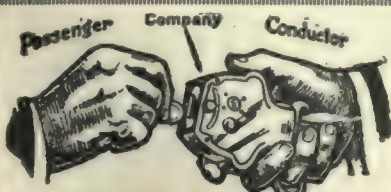
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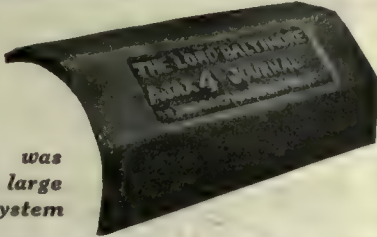
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EXPERIENCED instructor wanted for city and interurban motormen on road located in Middle West operating 200 cars and 8 electric locomotives with automatic air and type M and HL control. State age, experience and salary expected. P-357, Elec. Ry. Journal, Chicago.

HIGH-GRADE master mechanic wanted for street railway system in Texas city of 25,000. P-342, Elec. Ry. Journal, Chicago.

MAN wanted, experienced in electric railway track work, as shop inspector for frog and switch manufacturer; also draftsman who has had experience in designing manganese special track work. State salary and experience in first letter. P-361, Elec. Ry. Journal, Chicago.

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## POSITIONS WANTED

CHIEF engineer or engineer maintenance of way. 12 years' experience maintenance, construction and operation. Accurate knowledge of all matters related to way and structure department. Technically trained. References. PW-367, Elec. Ry. Journal, Chicago.

COMPETENT stores man, clear record, desires connection with electrically operated road. Especially qualified to reorganize and systematize general stores department. PW-358, Elec. Ry. Journal, Chicago.

ELECTRICIAN, age 35, technical graduate, desires responsible position with opportunities for advancement. 13 years' experience includes interior wiring, maintenance and operation of large power and rotary converter substations. Available now, location immaterial, least salary \$1800. PW-303, Elec. Ry. Journal.

ENGINEER—Railway specialist "can be engaged as maintenance of way engineer. Ten years' experience, track, roadway and overhead construction and maintenance; valuation, also public service reports. Technical graduate, at present employed as engineer. M. of W. PW-360, Elec. Ry. Journal.

## In Replying to "Blind" Ads

be careful to put on envelope the key number in the ad. and also local address of office to which reply is sent.

10th Ave. at 36th St., New York.  
935 Real Estate Trust Bldg., Phila.  
657 Leader-News Bldg., Cleveland.  
1570 Old Colony Bldg., Chicago.  
519 Newhouse Bldg., Salt Lake City.  
501 Rialto Bldg., San Francisco.

## Important

Original letters of recommendation or other papers of value should not be enclosed to unknown correspondents—send copies.

## POSITIONS WANTED

ELECTRICAL engineering graduate, formerly lieutenant in the army, with three years' experience in railway engineering, desires position with electric railway company or on electrification work. PW-359, Elec. Ry. Journal, Chicago.

GAS, electric and railway manager having 18 years' practical experience desires to locate. Present employed and can furnish the best of references from present and past employers. PW-368, Elec. Ry. Journal, Chicago.

MARRIED man, 9 years experience in claim department of large city and interurban company, wishes to make change. Seeks position as chief or assistant chief claim agent. PW-353, Elec. Ry. Journal, Leader-News Bldg., Cleveland.

MARRIED man wants situation as master mechanic. 14 years' experience. Would accept situation in either eastern or western states. References. Address PW-365, Elec. Ry. Journal.

OVERHEAD man with 17 years' experience on construction and maintenance of City and Interurban lines, wishes position as superintendent or general foreman. Successful in organizing and handling men. PW-364, Elec. Ry. Journal, Phila.

POSITION wanted. Man, 42 years of age, with 18 years of street and interurban railway experience as trainman, train dispatcher, and as an official for several years. Now employed, but desirous of making a change by May 1st. Western states preferred. Address PW-366, Elec. Ry. Journal, Leader-News Bldg., Cleveland.

## Cars For Sale

12 Double Truck Motor or Trailers. Brill 27-F trucks, 28-ft. closed bodies.

## 3 SNOW PLOWS

2 single, 1 double truck

ELECTRIC EQUIPMENT CO.  
Commonwealth Bldg. Philadelphia, Pa.

## Cars, Rails, Locomotives, Cranes, Generators, Turbines, Motors, Machine Tools, Hammers, Presses

Everything For  
POWER, RAILROADS, INDUSTRY,  
CONTRACTORS

What do you want to Buy or Sell?  
Write for our Bulletin No. 119.

Our ENGINEERING DEPARTMENT will Design, Construct and Finance your undertakings. Send us particulars.

## RAILWAY & POWER EQUIPMENT CO.

Woolworth Bldg., New York, N. Y.  
Telephones: Barclay 3251-3253

## FOR QUICK SALE

8—Closed, 31-Ft.

## MOTOR CARS

Length of body 22 ft. 9 in. Longitudinal seats. Mounted on Brill 21-E single trucks, wheel base 7 ft. 6 in. Westinghouse No. 38 motors. Excellent condition.

Price reasonable.

The Northern Ohio Traction & Light Co.  
Akron, Ohio

## Proposing to an Heiress

How to write the letter that gets the job

We cannot emphasize too strongly the great importance of writing the right kind of letter when answering Position Vacant advertisements.

FIRST  
FOREMOST  
ALWAYS

be sure to give in the letters you write all the information about yourself, that you would want if you were the prospective employer. Postage is wasted on letters that merely solicit an appointment. Why should writers of such letters be favored with appointments in competition with other applicants who give information in advance that indicates their fitness?

Write your letters of application with the same care that you would use in writing a proposal to an heiress.





## ROTARY CONVERTERS

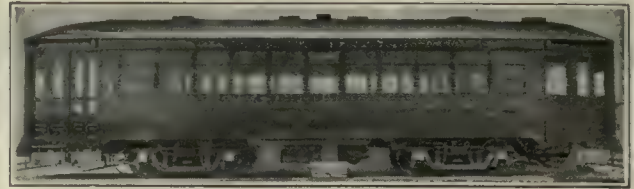
- 1—300-kw. Westinghouse Rotary Converter, 3-ph., 60-cy., 370-v. A.C., 575-v. D.C., 600 r.p.m.
- 1—200-kw. Westinghouse Rotary Converter, 3-ph., 60-cy., 370-v. A.C., 575-v. D.C.
- 1—150-kw. Westinghouse Rotary Converter, 2 or 3-ph., 60-cy., 250-v. D.C., 720 r.p.m.

## TURBINE

- 1—500-kw. Westg. Horizontal, 3-ph., 60-cy., 370-v. (can be rewound for any standard voltage), 3600 r.p.m., with or without condensing equipment.

### ARCHER & BALDWIN, INC.

114-118 Liberty St., New York, N. Y.  
Telephone 4337-4338 Rector



## IMMEDIATE DELIVERY

Five new P.A.Y.E. double truck cars. Length, 45-ft. Equipped with 4GE Co.'s 247 Motors and G. E. Co. Air Brakes.

### McGUIRE-CUMMINGS MANUFACTURING CO.

Cars and Trucks, Snow Sweepers, Electric Locomotives  
111 West Monroe Street, Chicago, Ill.

## WATER TUBE BOILERS

- 2—981 hp. Edge Moor, 235 lb. pressure.
- 1—450 hp. Heine, 170 lb. pressure.
- 4—400 hp. Stirling, 150 lb. pressure.
- 1—380 hp. Stirling, 150 lb. pressure.
- 2—360 hp. Erie City, 160 lb. pressure.
- 1—310 hp. Stirling, 200 lb. pressure.
- 6—308 hp. Heine, 140 lb. pressure.
- 1—305 hp. Babcock & Wilcox, 160 lb. pressure.
- 12—264 hp. Babcock & Wilcox, 175 lb. pressure.
- 8—250 hp. Stirling, 160 lb. pressure.
- 1—212 hp. Babcock & Wilcox, 160 lb. pressure.
- 2—204 hp. Babcock & Wilcox, 160 lb. pressure.

### MacGovern & Company, Inc.

114 Liberty St., New York, N. Y.  
Pittsburgh Office: 498 Union Arcade Bldg.

## Some One Wants to Buy

the equipment or machinery  
that you are not now using.

This may be occupying valuable  
space, collecting dust, rust and hard  
knocks in your shops and yards.

**Sell it Before depreciation Scraps it.**

*The Searchlight Section is helping others  
—let it help you also.*

805

## NEW RAILS

700 tons 100-lb. 600 tons 85-lb.  
500 tons 90-lb.

### Switch Turnouts

- 8—70-lb. ASCE, and frog Manganese.
- New.
- 1—60-lb. ARA-A 4 1/2" L. H. Good as new, 1500 kegs 1/2" x 5 1/2" in. "Zelnicker Select" Used Spikes.
- 300 kegs 1/2" x 5 1/2" in. New Spikes.

Track Accessories all kinds,  
prompt shipment.

### ZELNICKER IN ST. LOUIS

Get Bulletin 250 (250,000 Circ.)—  
A Big Money Saver.

CAN SHIP AT ONCE. The following:

## BRIDGES

good as new. Steel Girder, all Cooper E-35 with  
33% overload allowance.

2—27 ft. 6 in. through plate girder	
1—29 ft. through plate girder	
4—32 ft. 6 in. through plate girder	
4—42 ft. 6 in. through plate girder	
2—54 ft. 2 in. through plate girder	
2—59 ft. through plate girder	
1—64 ft. 5 in. through plate girder	
2—64 ft. 5 in. through plate girder	
2—64 ft. 11 in. through plate girder	
1—24 ft. Deck span	
3—43 ft. Deck span	Total weight 109,902 lbs.
2—45 ft. Deck span	
1—111 ft. Truss span	Weight 120,479 lbs.
12—30 ft. Deck spans (Viaduct)	Total weight
2—43 ft. Deck spans (Viaduct)	771,034 lbs.
2—60 ft. Deck spans (Viaduct)	
6—Towers and 2 single bents	265,650 lbs.
	39,170 lbs.

M. K. FRANK

Frick Bldg., Pittsburgh, Pa.

## CLEVELAND MATURE WORKS

Incorporated  
Cleveland, Ohio

## Everything in the Line of Repairs to Electrical Machinery

Complete Armatures, New Armatures,  
Rewound Armature Cores, Armature  
Shafts, Armature Coils, Fields and  
Commutators.

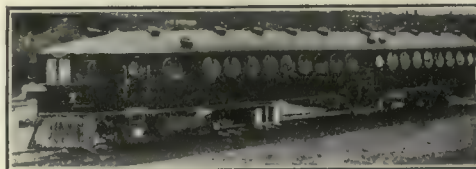
Established 22 Years

## RAILS

15,000 TONS—NEW and RELAYERS  
NEW—12 lb., 16 lb., 20 lb., 25 lb., 30 lb.,  
40 lb., 60 lb., 70 lb., 75 lb., 80 lb., 84  
lb., 90 lb.  
RELAYERS—30 lb., 35 lb., 40 lb., 45 lb.,  
56 lb., 60 lb., 70 lb., 80 lb., 85 lb., 90  
lb., 100 lb.

Fastenings, New Bolts, Nuts and Spikes.  
New Frogs, Switches, Crossings and all  
accessories. Carload and less carload in-  
quiries and orders a specialty. Rails cut  
to lengths for structural purposes. At-  
tractive prices. Immediate shipments from  
stock.

L. B. FOSTER COMPANY  
Park Bldg., Pittsburgh, Pa.



We own and offer for sale  
a used McKean Motor 71-  
Passenger Car, all steel.  
In first class condition.  
Write or wire us for fur-  
ther information.

## HYMAN-MICHAELS CO.

People's Gas Building, Chicago  
Phone: Harrison 1100

New and Relaying Rails

BUYERS OF ABANDONED RAILROADS

### FOR SALE CARS

- 2—McKean Gaso-Electric Cars.
- 12—Differential 20-yd. Cars.
- 5—Gasoline Passenger Cars.
- 50—Freight Cars.
- 12—Electric Sets.

Get our Lists and Prices  
J. F. DONAHOO CO. Birmingham, Ala.

**GET YOUR WANTS INTO THE  
SEARCHLIGHT**





Exterior View



Exterior View



Interior View

## United States Shipping Board Emergency Fleet



Interior View

**BIDS**—For the purchase, f.o.b. cars Philadelphia, of any number of cars up to and including six, will be received by J. W. Smith, Manager Passenger Transportation and Housing Division, United States Shipping Board Emergency Fleet Corporation, No. 140 North Broad Street, Philadelphia.

**Delivery**—Immediate.

**Terms**—25 per cent. sight draft. Balance to be arranged.

**General**—Cars and equipment are entirely new, are open to inspection on request at the works of the manufacturer, the J. G. Brill Company, and cost, as is, \$13,570 each.

### SPECIFICATIONS BODY

Length over anti-climbers.....	45 ft. 6 in.
Length over corner posts.....	33 ft. 0 in.
Length over vestibules.....	44 ft. 2 in.
Extreme width.....	8 ft. 6 in.
Height from rail over trolley board.....	11 ft. 8 in.
Truck centers.....	21 ft. 0 in.
Radius of shortest curve.....	35 ft.
Seating capacity.....	50
Sheathing (sheet steel).....	3/32 in.
Doors, Hand operated	
Headlight, Crouse Hinds "Imperial"	
Registers, International R-7	
Fare Boxes, International G-15	
Heater, 1—Peter Smith Hot Air	
Hand Brakes, National	

### AIR EQUIPMENT

G. E. Straight-Air Compressor C.P.-27

### TRUCKS

Brill 77 E-1	Wheel Base, 5 ft. 9 in.
Diameter of Wheel.....	33 in.
Tread.....	3 in.
Flange.....	$\frac{1}{2}$ x $\frac{1}{4}$ in.
Axle in Motor Bearing.....	$\frac{1}{2}$ in.
Axle in Gear Seat.....	5 in.
Gauge of Track.....	4 ft. 8 $\frac{1}{2}$ in.

### MOTOR EQUIPMENT

4—Westinghouse 514 A-600-volt, 40-hp. Motors, double end K-35 G-2 control.  
Solid Gears—58 teeth Pinions—15 teeth

### PERFORMANCE

The free running speed on tangent level track and 525-volt will be 30-31 m.p.h. with car carrying 50 passengers.

### WEIGHT

Light, 42240 With 50 passengers, 49,740

**BIDS**—For the purchase, f.o.b. cars, Philadelphia, of one snow plow will be received by J. W. Smith, Manager, Division of Passenger Transportation and Housing, United States Shipping Board Emergency Fleet Corporation, 140 North Broad Street, Philadelphia.

**Delivery**—Immediate.

**Terms**—25 per cent. sight draft, balance to be arranged.

**General**—The plow and equipment is entirely new, is open to inspection on request, at the works of the manufacturer, the J. G. Brill Company, Philadelphia, and cost, as is, \$13,134.

### SPECIFICATIONS

Length over all.....	41 ft. 4 in.
Length over end body sheathing.....	31 ft. 6 $\frac{1}{2}$ in.
Length of body inside.....	30 ft. 9 in.
Width over side body sheathing.....	7 ft. 6 in.
Width over body inside.....	6 ft. 8 $\frac{1}{2}$ in.
Width over all wings closed not to exceed.....	8 ft. 10 in.
Width over all wings open.....	12 ft. 9 in.
Height from bottom of sill to top roof.....	8 ft. 0 in.
Height from top of rail to bottom sill.....	2 ft. 6 $\frac{1}{2}$ in.
Height of body inside—clear.....	6 ft. 4 in.
Height from top of rail to top of trolley stand.....	10 ft. 9 $\frac{1}{2}$ in.
Height of share blades.....	5 ft. 0 in.

### DIMENSIONS OF MAIN TIMBERS

Side sills.....	4 $\frac{1}{2}$ x 11 $\frac{1}{2}$ in.
Intermediate sills.....	5 x 3 in.
Cross timbers.....	4 x 7 in.
Side posts.....	2 $\frac{1}{2}$ x 4 in.
Side posts at truss.....	2 $\frac{1}{2}$ x 5 in.
Flooring, single.....	1 $\frac{1}{2}$ in.
Lift of plow share.....	6 in.
Lift of digger.....	3 in.
Gauge.....	4 ft. 8 $\frac{1}{2}$ in.
To operate on curve of.....	35 ft. radius

**AXLE**—Open hearth steel, 4  $\frac{1}{2}$  x 8-in. journal, 5  $\frac{1}{2}$ -in. wheel fit, 5  $\frac{1}{2}$ -in. gear fit, 5-in. dia. motor fit.

**AIR BRAKES**—Westinghouse Traction Brake Co.'s schedule A M M automatic with graduated release and emergency straight air feature.

1—D-2 E G 25-ft. compressor.

1—Brake cylinder, 10 x 12 in.

2—Main reservoirs, 16 x 42 in.

**DIGGER**—Double truck standard, four per plow, arranged to operate from both ends of plow.

**DRAW BARS**—Special, radial M.C.B. applied as per B/P 6952, to couple with Tomlinson and spring carrier.

**MOTOR EQUIPMENT**—4—Gen. Elect. 201-G, 65-hp.

2—K-35 G-2 controllers and equipment.

71-tooth solid gears.

15-tooth pinions.

**SPREADERS**—12 ft. 0 in. long, furnished by Car Builder.

**SIDES**— $\frac{1}{2}$ -in. sheathing.

**TRUCKS**—Brill standard 53-F for 8-wheel plow—4 diggers.

**TRUCK CENTERS**—14 ft. 0 in.

**TRUCK WHEEL BASE**—4 ft. 0 in.

**SHARE LIFTING DEVICE**—Standard pneumatic (air). We furnish and apply 2—8-in. cylinders, 2— $\frac{1}{2}$ -in. engineers valves complete and 1—engineer's handle.

**WHEELS**—33-in. cast iron, 3-in. tread,  $\frac{1}{2}$ -in. flange.

**NOTICE**—Apparatus to be located that motormen will be in R. H. corner and can look out of window.

**WEIGHT**—Complete weight, 56,920 lb.



# WHAT AND WHERE TO BUY

Equipment, Apparatus and Supplies Used by the Electric Railway Industry with  
Names of Manufacturers and Distributors Advertising in this Issue

**Advertising, Street Car**  
Collier, Inc., Barron G.

**Air Rectifiers**  
Holden & White, Inc.

**Amusement Devices**  
Este Co., The J. D.

**Anchors, Guy**  
Electric Service Supplies Co.  
Holden & White, Inc.  
Ohio Brass Co.  
Westinghouse Elec. & M. Co.

**Ash Storage Tanks, C. Iron**  
Green Engineering

**Automobiles and Bu-**  
rill Co., The J. G.

**Axle Straighteners**  
Columbia M. W. & M. I. Co.

**Axles, Car Wheel**  
Bemis Car Truck Co.  
Brill Co., The J. G.  
Carnegie Steel Co.  
National Railway Appliance Co.  
St. Louis Car Co.  
Standard Steel Works Co.  
Westinghouse Elec. & M. Co.

**Babbitting Devices**  
Columbia M. W. & M. I. Co.

**Babbitt Metal**  
Ajax Metal Co.

**Badges and Buttons**  
Electric Service Supplies Co.  
International Register Co., The

**Batteries, Dry**  
Nichols-Lintern Co.

**Batteries, Storage**  
Electric Storage Battery Co.

**Bearings and Bearing Metals**  
Ajax Metal Co.  
Bemis Car Truck Co.  
Columbia M. W. & M. I. Co.  
Eureka Co.  
General Electric Co.  
More-Jones Brass & Metal Co.  
St. Louis Car Co.  
Westinghouse Elec. & M. Co.

**Bearings, Center and Roller Side**  
Holden & White, Inc.

**Bearings, Roller and Ball**  
S K F Ball Bearing Co.

**Bells and Gongs**  
Brill Co., The J. G.  
Columbia M. W. & M. I. Co.  
Electric Service Supplies Co.  
St. Louis Car Co.

**Benders, Rail**  
Niles-Bement-Pond Co.  
Zelnicker, Walter A., Supply Co., Inc.

**Bulbers**  
Babcock & Wilcox Co.

**Boiler Tubes**  
National Tube Co.

**Bond Testers**  
American Steel & Wire Co.  
Lincoln Bonding Co.

**Bonding Apparatus**  
American Steel & Wire Co.  
Electric Railway Improvement Co.  
Electric Service Supplies Co.  
Lincoln Bonding Co.  
Ohio Brass Co.

**Bonds, Rail**  
American Steel & Wire Co.  
Electric Railway Improvement Co.  
Electric Service Supplies Co.  
General Electric Co.  
Lincoln Bonding Co.  
Ohio Brass Co.  
Westinghouse Elec. & M. Co.

**Boring Tools, Car Wheel**  
Niles-Bement-Pond Co.

**Brackets and Cross Arms (See also  
Poles, Ties, Posts, Etc.)**  
Bates Expanded Steel Truss Co.  
Hubbard & Co.  
Linsley Bros. Co.  
Ohio Brass Co.

**Brake Adjusters**  
Holden & White, Inc.  
Smith-Ward Brake Co.  
Westinghouse Traction Brake Co.

**Brake Shoes**  
Amer. Brake Shoe & Fdry. Co.  
Barbour-Stockwell Co.  
Brill Co., The J. G.  
Columbia M. W. & M. I. Co.  
St. Louis Car Co.

**Brakes, Brake Systems and Brake  
Parts**  
Bemis Car Truck Co.  
Brill Co., The J. G.  
Columbia M. W. & M. I. Co.  
General Electric Co.  
Holden & White, Inc.  
National Brake Co.  
St. Louis Car Co.  
Safety Car Devices Co.  
Westinghouse Trac. B. Co.

**Brick, Fire**  
Green Engineering Co.

**Brooms, Track, Steel or Rattan**  
Faxon Co., J. W.  
Zelnicker, Walter A., Supply Co., Inc.

**Brushes, Carbon**  
General Electric Co.  
Jeandron, W. J.  
Morgan Crucible Co.  
United States Graphite Co.  
Westinghouse Elec. & M. Co.

**Brushes, Graphite**  
United States Graphite Co.

**Brush Holders**  
Anderson Mfg. Co., A. & J. M.  
Columbia M. W. & M. I. Co.  
Eureka Co.

**Buckets**  
Blaw-Knox Company

**Bushings, Case Hardened & Man-  
ganese**  
Bemis Car Truck Co.

**Cables. (See Wires and Cables.)**

**Carbon Brushes. (See Brushes,  
Carbon.)**

**Car Equipment. (For Fenders,  
Heaters, Registers, Wheels,  
etc.—See those headings.)**

**Car Trimmings. (For Curtains,  
Registers, Doors, Seats, etc.—  
See those headings.)**

**Car Panel Safety Switches**  
Westinghouse Elec. & Mfg. Co.

**Cars, Passenger, Freight, Express,  
etc.**

American Car Co.  
Brill Co., The J. G.  
Kuhlman Car Co., G. C.  
McGuire-Cummings Mfg. Co.  
St. Louis Car Co.  
Wason Mfg. Co.

**Cars, Second Hand**  
Electric Equipment Co.

**Cars, Self-Propelled**  
Electric Storage Battery Co.  
General Electric Co.

**Castings, Brass, Composition or  
Copper**  
Ajax Metal Co.  
Anderson Mfg. Co., A. & J. M.  
Columbia M. W. & M. I. Co.  
Eureka Co.  
More-Jones Brass & Metal Co.

**Castings, Gray Iron and Steel**  
Bemis Car Truck Co.  
Columbia M. W. & M. I. Co.  
St. Louis Car Co.  
Standard Steel Works Co.

**Castings, Malleable and Brass**  
Amer. Brake Shoe & Fdry. Co.  
Bemis Car Truck Co.  
Columbia M. W. & M. I. Co.  
St. Louis Car Co.

**Catchers and Retrievers, Trolley**  
Electric Service Supplies Co.  
Holden & White, Inc.  
Ohio Brass Co.  
Wood Co., Chas. N.

**Circuit Breakers**  
The Cutter Electrical & Mfg. Co.  
General Electric Co.  
Westinghouse Elec. & Mfg. Co.

**Clamps and Connectors for Wires  
and Cables**  
Anderson Mfg. Co., A. & J. M.  
Electric Service Supplies Co.  
General Electric Co.  
Hubbard & Co.  
Ohio Brass Co.  
Westinghouse Elec. & Mfg. Co.

**Cleaners and Scrapers Track—(See  
also Snow-Flows, Sweepers and  
Brooms.)**  
Brill Co., The J. G.  
Ohio Brass Co.

**Clusters and Sockets**  
General Electric Co.

**Coal and Ash Handling—(See Con-  
veying and Hoisting Machin-  
ery.)**

**Coil Banding and Winding Ma-  
chines**  
Columbia M. W. & M. I. Co.  
Electric Service Supplies Co.

**Colls, Armature and Field**  
Cleveland Armature Works.  
Columbia M. W. & M. I. Co.  
D & W Fuse Co.  
General Electric Co.  
Independent Lamp & Wire Co.  
Rome Wire Co.  
Westinghouse Elec. & M. Co.

**Coils, Choke and Kicking**  
Electric Service Supplies Co.  
General Electric Co.  
Westinghouse Elec. & M. Co.

**Coin-Counting Machines**  
International Register Co., The

**Commutator Slotters**  
Electric Service Supplies Co.  
General Electric Co.  
Westinghouse Elec. & Mfg. Co.  
Wood Co., Chas. N.

**Commutator Truing Devices**  
General Electric Co.

**Commutators or Parts**  
Cleveland Armature Works.  
Columbia M. W. & M. I. Co.  
Eureka Co.  
General Electric Co.  
Westinghouse Elec. & Mfg. Co.

**Compressors, Air**  
General Electric Co.  
Westinghouse Trac. B. Co.

**Concrete Mixers**  
Blaw-Knox Co.

**Condensers**  
General Electric Co.  
Westinghouse Elec. & Mfg. Co.

**Connectors, Solderless**  
Westinghouse Elec. & Mfg. Co.

**Controller Fingers**  
Trigger Lock Reversible Controller  
Finger

**Controller Regulators**  
Electric Service Supplies Co.

**Controllers or Parts**  
Columbia M. W. & M. I. Co.  
General Electric Co.  
Westinghouse Elec. & Mfg. Co.

**Controlling Systems**  
General Electric Co.  
Westinghouse Elec. & Mfg. Co.

**Converters, Rotary**  
General Electric Co.  
Westinghouse Elec. & Mfg. Co.

**Conveying and Hoisting Machinery**  
Columbia M. W. & M. I. Co.  
Green Engrg. Co.

**Conveyors, Belt**  
Portable Machinery Co.

**Conveyors, Coal and Ash**  
Portable Machinery Co.

**Conveyors, Portable**  
Portable Machinery Co.

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Brill Co., The J. G.  
Electric Service Supplies Co.  
International Register Co., The  
Samson Cordage Works.

**Cord Connectors and Couplers**  
Electric Service Supplies Co.  
Samson Cordage Works.  
Wood Co., Chas. N.

**Couplers, Car**  
Brill Co., The J. G.  
Ohio Brass Co.  
Van Dorn Coupler Co.  
Westinghouse Trac. B. Co.

**Cranes**  
Toledo Bridge & Crane Co., The.

**Cresosoting. (See Wood Preserva-  
tives)**

**Cross Arms. (See Brackets)**

**Crossing Foundations**  
International Steel Tie Co.

**Crossing Signals. (See Signals,  
Crossing)**

**Crossings, Track. (See Track,  
Special Work)**

**Culverts**  
Armco Iron Culvert & Flume  
Mfrs. Assn.  
Canton Culvert & Silo Co.

**Curtains and Curtain Fixtures**  
Brill Co., The J. G.  
Electric Service Supplies Co.  
St. Louis Car Co.

**Dealers' Machinery**  
Archer & Baldwin  
Cleveland Armature Wks.  
Electric Equipment Co.  
Foster Co., L. B.  
Griswold Machine Co., Geo. M.  
Hyman Michaels Co.  
MacGovern & Co., Inc.  
Zelnicker Supply Co., Inc.  
Walter A.

**Derailing Devices. (See also Track  
Work)**  
Cleveland Frog & Crossing Co.

**Destination Signs**  
Columbia M. W. & M. I. Co.  
Electric Service Supplies Co.

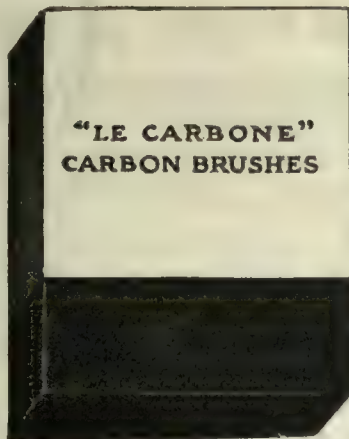
**Detective Service**  
Wish Service, Inc., P. Edward.

**Dogs, Lathe**  
Williams & Co., J. H.

**Door Operating Devices**  
Consolidated Car Heating Co.  
National Pneumatic Co., Inc.  
Safety Car Devices Co.

**Doors and Door Fixtures**  
Brill Co., The J. G.  
General Electric Co.  
Hale & Kilburn Corp.





**Le Carbone**  
Carbon Brushes are uniform. They talk for themselves.

**W. J. Jeandron**  
173 Fulton Street  
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Pittsburgh Office:  
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Canadian Distributors:  
Lyman Tube & Supply Co., Ltd.  
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**Weston**

**Electrical Indicating Instruments**

are unqualifiedly superior to any other instruments designed for the same service.  
A.C. or D.C. Switchboard or Portable Instruments for every field of Indicating Electrical Measurement. In writing for catalogs and bulletins, please specify the field that interests you.

**WESTON ELECTRICAL INSTRUMENT CO.**  
21 Weston Ave., Newark, N. J.  
Branch Offices in the Larger Cities.

*Announcing Our New Product*

# Enamel Magnet Wire

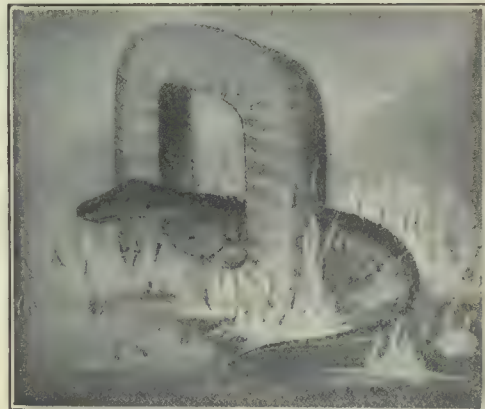
**T**O those interested in Enamel Magnet Wire we beg to announce our new line of Enamel Magnet Wire, either plain, or with silk or cotton covering.

We invite correspondence, and will send samples and prices on request.

**Independent Lamp & Wire Co., Inc.**

OFFICES:  
1737 Broadway, New York

FACTORIES:  
York, Pa., and Weehawken, N. J.



**Get those coils back into service—quick !**

Don't let LABOR SHORTAGE hold them up in your coil department. You can't get more men—but you can save time and money by sending the coils to us for re-insulation with

## SALAMANDER Pure Asbestos

We will return them promptly—better insulated and more durable than when new.

"Salamander" asbestos wire excels in insulating value and cannot burn out under the severest overload.

Leading electric railways are our best customers.

Write us for details now

**Independent Lamp & Wire Co., Inc.**

OFFICES:  
1737 Broadway, New York

FACTORIES:  
York, Pa., and Weehawken, N. J.



**Doors, Folding Vestibule**  
National Pneumatic Co., Inc.

**Draft Rigging.** (See-Couplers)

**Drills, Track**  
American Steel & Wire Co.  
Electric Service Supplies Co.  
Niles-Bement-Pond Co.  
Ohio Brass Co.

**Dryers, Sand**  
Electric Service Supplies Co.  
Zelnicker Supply Co., Walter A., Inc.

**Electrical Wires and Cables**  
Roebling's Sons Co., J. A.

**Engineers, Consulting, Contracting and Operating**  
Archbold-Brady Co.  
Arnold Co., The  
Bylesby & Co., H. M.  
Drum & Co., A. L.  
Ford, Bacon & Davis  
Holst, Englehardt W.  
Republic Engineers, Inc.  
Richey, Albert S.  
Sanderson & Porter.  
Scofield Engineering Co.  
Stone & Webster.  
White Companies, The J. G.  
Woodmansee & Davidson Engineering Co.

**Engines, Gas and Oil**  
Westinghouse Elec. & Mfg. Co.

**Engines, Steam**  
Westinghouse Elec. & Mfg. Co.

**Fare Boxes**  
Brill Co., The J. G.  
Cleveland Fare Box Co.  
International Register Co., The  
National Railway Appliance Co.

**Fences, Woven Wire and Fence Posts**  
American Steel & Wire Co.  
Page Steel & Wire Co.

**Fenders and Wheel Guards**  
Brill Co., The J. G.  
Cleveland Fare Box Co.  
Electric Service Supplies Co.  
Star Brass Works.

**Fibre and Fibre Tubing**  
Westinghouse Elec. & Mfg. Co.

**Field Coils.** (See Coils)

**Filters, Water**  
Scaife & Sons Co., Wm. B.

**Floodlights**  
Electric Service Supplies Co.

**Flooring Composition**  
American Mason Safety Tread Co.

**Forgings**  
Eureka Co.  
Standard Steel Works Co.  
Williams & Co., J. H.

**Frogs, Track.** (See Track Work)

**Furnaces.** (See Stokers)

**Fuses and Fuse Boxes**  
Columbia M. W. & M. I. Co.  
D & W Fuse Co.  
General Electric Co.  
Westinghouse Elec. & Mfg. Co.

**Fuses, Refillable**  
Columbia M. W. & M. I. Co.  
General Electric Co.

**Galvanizing**  
Cattle, Jos. P., & Bros.

**Gaskets**  
Power Specialty Co.  
Westinghouse Traction Brake Co.

**Gas Producers**  
Westinghouse Elec. & Mfg. Co.

**Gates, Car**  
Brill Co., The J. G.

**Gages, Oil and Water**  
Ohio Brass Co.

**Gear Blanks**  
Carnegie Steel Co.  
Standard Steel Works Co.

**Gear Cases**  
Columbia M. W. & M. I. Co.  
Electric Service Supplies Co.  
Westinghouse Elec. & Mfg. Co.

## WHAT AND WHERE TO BUY

**Gears and Pinions**  
Columbia M. W. & M. I. Co.  
Electric Service Supplies Co.  
National Railway Appliance Co.  
Nuttall Co., R. D.

**Generating Sets, Gas-Electric**  
General Electric Co.

**Generators**  
General Electric Co.  
Westinghouse Elec. & Mfg. Co.

**Gongs.** (See Bells and Gongs)

**Graphite**  
Morgan Crucible Co.

**Greases.** (See Lubricants)

**Grinders and Grinding Supplies**  
Indianapolis Switch & Frog Co.  
Metal & Thermit Corp.  
Railway Track-work Co.

**Grinding Blocks and Wheels**  
Railway Track-work Co.

**Guards, Trolley**  
Electric Service Supplies Co.  
Ohio Brass Co.

**Haps, Trolley**  
Anderson M. Co., A. & J. M.  
Electric Service Supplies Co.  
More-Jones B. & M. Co.  
Nuttall Co., R. D.  
Star Brass Works.

**Headlights**  
Electric Service Supplies Co.  
General Electric Co.  
Ohio Brass Co.  
St. Louis Car Co.

**Heaters, Car (Electric)**  
Consolidated Car Heating Co.  
Gold Car Heating & Lighting Co.  
Holden & White, Inc.  
Smith Heater Co., Peter.

**Heaters, Car, Hot Air and Water**  
Cooper Heater Co.  
Holden & White, Inc.  
Smith Heater Co., Peter.

**Heaters, Car (Stove)**  
Electric Service Supplies Co.  
Holden & White, Inc.  
Smith Heater Co., Peter.

**Hoists and Lifts**  
Columbia M. W. & M. I. Co.  
Ford Chain Block & Mfg. Co.  
Niles-Bement-Pond Co.  
Toledo Bridge & Crane Co., The

**Hose, Bridges**  
Ohio Brass Co.

**Hose, Pneumatic and Fire**  
Westinghouse Traction Brake Co.

**Hydraulic Machinery**  
Niles-Bement-Pond Co.

**Inspection**  
Electrical Testing Lab's.

**Instruments, Measuring, Testing and Recording**  
Economy Electric Devices Co.  
General Electric Co.  
Westinghouse Elec. & Mfg. Co.  
Weston Elec'l Instrument Co.

**Insulating Cloth, Paper and Tape**  
General Electric Co.  
Irrington Varnish & Insulator Co.  
Standard Underground Cable Co.  
Standard Woven Fabric Co.  
Westinghouse Elec. & Mfg. Co.

**Insulation.** (See also Paints)  
Anderson M. Co., A. & J. M.  
Drew Electric & Mfg. Co.  
Electric Service Supplies Co.  
General Electric Co.  
Holden & White, Inc.  
Mitchell-Rand Mfg. Co.  
Westinghouse Elec. & Mfg. Co.

**Insulators.** (See also Line Material)  
Anderson M. Co., A. & J. M.  
Electric Service Supplies Co.

**General Electric Co.**  
Ohio Brass Co.  
Westinghouse Elec. & Mfg. Co.

**Insulator Pins**  
Electric Service Supplies Co.  
Hubbard & Co.

**Insurance, Fire**  
Marsh & McLennan

**Jacks.** (See also Cranes, Hoists and Lifts)  
Brill Co., The J. G.  
Buckeye Jack Mfg. Co.  
Columbia M. W. & M. I. Co.  
National Ry. Appliance Co.  
Templeton, Kenly Co., Ltd.

**Joints, Rail**  
Carnegie Steel Co.  
Lackawanna Steel Co.  
Rail Joint Co., The  
Zelnicker Supply Company, Inc., Walter A.

**Journal Boxes**  
Bemis Car Truck Co.  
Brill Co., J. G.  
S K F Ball Bearing Co.

**Junction Boxes**  
Standard Underground Cable Co.

**Laboratory**  
Electrical Testing Lab's.

**Lamp Guards and Fixtures**  
Anderson M. Co., A. & J. M.  
Electric Service Supplies Co.  
General Electric Co.  
Westinghouse Elec. & Mfg. Co.

**Lamps, Arc and Incandescent.** (See also Headlights)  
Anderson M. Co., A. & J. M.  
General Electric Co.  
Westinghouse Elec. & Mfg. Co.

**Lamps, Signal and Marker**  
Nichols-Lintern Co.  
Ohio Brass Co.

**Lathe Attachments**  
Williams & Co., J. H.

**Lathes, Car Wheel**  
Niles-Bement-Pond Co.

**Lighting Regulators, Car**  
Holden & White, Inc.

**Lightning Protection**  
Anderson M. Co., A. & J. M.  
Electric Service Supplies Co.  
General Electric Co.  
Ohio Brass Co.  
Westinghouse Elec. & Mfg. Co.

**Line Material.** (See also Brackets, Insulators, Wires, etc.)  
Anderson M. Co., A. & J. M.  
Columbia M. W. & M. I. Co.  
Drew Electric & Mfg. Co.  
Electric Service Supplies Co.  
Eureka Co.  
General Electric Co.  
Holden & White, Inc.  
Hubbard & Co.  
More-Jones B. & M. Co.  
Ohio Brass Co.  
Westinghouse Elec. & Mfg. Co.

**Locomotives, Electric**  
Brill Co., The J. G.  
General Electric Co.  
McGuire-Cummings Mfg. Co.  
Westinghouse Elec. & Mfg. Co.

**Lubricating Engineers**  
Galena-Signal Oil Co.

**Lubricants, Oil and Grease**  
Galena-Signal Oil Co.

**Lumber.** (See Poles, Ties, etc.)

**Machine Tools**  
Columbia M. W. & M. I. Co.

**Machine Work**  
Columbia M. W. & M. I. Co.  
Holden & White, Inc.

**Metal Tickets**  
Seovill Mfg. Co.

**Meters, Car, Watt-Hour**  
Economy Electric Devices Co.

**Meters.** (See Instruments)  
Electric Service Supplies Co.  
Wood Co., Chas. N.

**Mirrors for Motormen**  
Drew Elec. & Mfg. Co.

**Motors, Electric**  
Westinghouse Elec. & Mfg. Co.

**Motor Generation, Bonding and Welding**  
Lincoln Bonding Co.

**Nuts and Bolts**  
Barbour-Stockwell Co.  
Bemis Car Truck Co.  
Columbia M. W. & M. I. Co.  
Hubbard & Co.  
Lackawanna Steel Co.

**Oils.** (See Lubricants)

**Oxy-Acetylene.** (See Cutting Apparatus, Oxy-Acetylene)

**Packing**  
Irrington Varnish & Insulator Co.  
Power Specialty Co.  
Westinghouse Traction Brake Co.

**Paints and Varnishes. (Insulating)**  
Mitchell-Rand Mfg. Co.

**Paints and Varnishes for Woodwork**  
National Ry. Appliance Co.

**Paving Material**  
Am. Brake Shoe & Fdy. Co.  
Barrett Co., The

**Pickups, Trolley Wire**  
Electric Service Supplies Co.  
Ohio Brass Co.

**Pinion Pullers**  
Columbia M. W. & M. I. Co.  
Electric Service Supplies Co.  
General Electric Co.  
Wood Co., Chas. N.

**Pinions.** (See Gears)

**Pins, Case Hardened, Wood and Iron**  
Bemis Car Truck Co.  
Electric Service Supplies Co.  
Ohio Brass Co.  
Westinghouse Traction Brake Co.

**Pipe**  
National Tube Co.

**Pipe Fittings**  
Power Specialty Co.  
Standard Steel Works Co.  
Westinghouse Traction Brake Co.

**Planers.** (See Machine Tools)

**Pilers, Insulated**  
Electric Service Supplies Co.

**Pole Reinforcing**  
Hubbard & Co.

**Pole Sleeves**  
Drew Elec. & Mfg. Co.

**Poles and Ties, Treated**  
Lindaley Bros. Co.  
Page & Hill Co.  
Valentine-Clark Co.

**Poles, Metal Street**  
Bates Expanded Steel Truss Co.  
Hubbard & Co.

**Poles, Ties, Posts, Piling and Lumber**  
Caarney & Co., B. J.  
Lindaley Bros. Co.  
Page & Hill Co.  
Valentine-Clark Co.  
White Marble Lime Co.

**Poles, Trolley**  
Columbia M. W. & M. I. Co.  
Electric Service Supplies Co.  
National Tube Co.  
Nuttall Co., R. D.

**Poles, Tubular Steel**  
National Tube Co.

**Power Saving Devices**  
Arthur Power-Saving Recording Co.  
Economy Electric Devices Co.



## Smith-Ward Brake Slack Adjusters

*Promote Braking Safety*

Under normal conditions where brake rigging is set up S-W-B Adjusters work practically 100% efficiently, and when your cars are equipped with them there are no "ifs" about their operation. They are "safe" all the time. Hundreds of cars equipped with our adjusters now in daily operation are proofs of that statement.

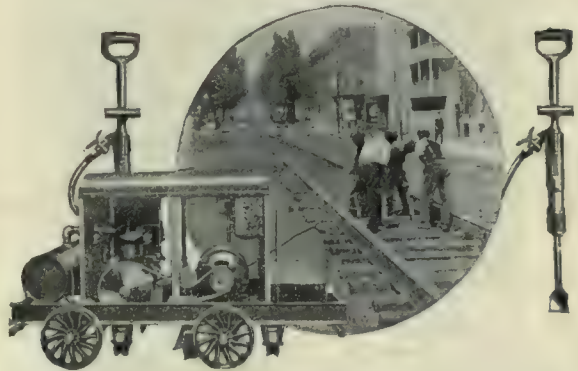
*Can you say that of any other Adjuster?*

**Smith-Ward Brake Co.**

Bush Terminal Bldg. No. 1

233 Thirty-Seventh St., Brooklyn, N. Y.

## "IMPERIAL" TIE TAMPING OUTFITS



Tamp any kind of track ballast, cut asphalt and tear up concrete and save labor, time and money.

*Bulletin 9123*

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This man  
received an increase of  
30 per cent in his salary

—because he had the business judgment  
to announce this want in the Searchlight  
of Electric Railway Journal.

POSITION wanted by young man with  
7 years' experience as armature winder  
and controller man. Best of references.  
Box      Elec. Ry. Jour.

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derful. I received 8 replies and accepted  
a new position with more than 30 per  
cent increase in salary."

His Ad. ran four times at a cost of \$2  
Was it worth it?

*Put your Wants in the Searchlight*

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## BRAKE SHOE STANDARDS

SAVE MATERIAL  
SAVE LABOR  
SAVE TIME  
SAVE MONEY

*Ask Us?*

**American Brake Shoe & Foundry Co.**  
30 Church Street, New York

McCormick Bldg., Chicago

Chattanooga, Tenn.



**Pressure Regulators**  
General Electric Co.  
Ohio Brass Co.  
Westinghouse Electric & Mfg. Co.

**Punches, Ticket**  
Bonney-Vehslage Tool Co.  
International Register Co., The  
Wood Co., Chas. N.

**Purifiers, Feed Water**  
Scaife & Sons Co., Wm. B.

**Rail Grinders.** (See Grinders)

**Railway Safety Switches**  
Westinghouse Elec. & Mfg. Co.

**Rail Welding.** (See Brazing and Welding Processes)

**Rails, Relaying**  
Zelnicker, Walter A., Supply Co., Inc.

**Rattan**  
Brill Co., The J. G.  
Electric Service Supplies Co.  
Hale & Kilburn Corp.  
McGuire-Cummings Mfg. Co.  
St. Louis Car Co.

**Recorders, Power Saving**  
Arthur Power-Saving Recorder Co.

**Registers and Fittings**  
Brill Co., The J. G.  
Electric Service Supplies Co.  
Exell Mfg. Co., The  
International Register Co., The  
Rooke Automatic Register Co.

**Reinforcement, Concrete**  
American Steel & Wire Co.

**Repair Shop Appliances.** (See also Coil Banding and Winding Machines)  
Columbia M. W. & M. I. Co.  
Electric Service Supplies Co.

**Repair Work.** (See also Coils)  
Cleveland Armature Works  
Columbia M. W. & M. I. Co.  
General Electric Co.  
Independent Lamp & Wire Co.  
Westinghouse Elec. & Mfg. Co.

**Replacers, Car**  
Columbia M. W. & M. I. Co.  
Electric Service Supplies Co.

**Resistance, Grid**  
Columbia M. W. & M. I. Co.

**Resistance, Wire and Tube**  
General Electric Co.  
Westinghouse Elec. & Mfg. Co.

**Retrievers, Trolley.** (See Catchers and Retrievers, Trolley)

**Rheostats**  
General Electric Co.  
Westinghouse Elec. & Mfg. Co.

**Sanders, Track**  
Brill Co., The J. G.  
Cleveland Fare Box Co.  
Columbia M. W. & M. I. Co.  
Electric Service Supplies Co.  
Holden & White, Inc.  
Nichols-Lintern Co.  
Ohio Brass Co.  
St. Louis Car Co.

**Sash Fixtures, Car**  
Brill Co., The J. G.

**Sash Metal, Car Window**  
Hale & Kilburn Corp.

**Scrapers, Track.** (See Cleaners and Scrapers, Track)

**Seats, Car.** (See also Rattan)  
Brill Co., The J. G.  
Hale & Kilburn Corp.  
St. Louis Car Co.

**Second-Hand Equipment**  
Archer & Baldwin  
Cleveland Armature Wks.  
Duquesne Elec. & Mfg. Co.  
Electric Equipment Co.  
Exell Mfg. Co., The  
Foster Co., L. B.  
Griswold Machine Co., G. M.  
Hyman Michaels Co.  
MacGovern & Co., Inc.  
Zelnicker Supply Co., W. A.

**Shades, Vestibule**  
Brill Co., The J. G.

## WHAT AND WHERE TO BUY

**Shovels**  
Hubbard & Co.

**Shovels, Power**  
Blaw-Knox Co.

**Signals, Car Marker**  
Nichols-Lintern Co.

**Signals, Car Starting**  
Consolidated Car Heating Co.  
Electric Service Supplies Co.  
National Pneumatic Co.

**Signal Systems, Block**  
Electric Service Supplies Co.  
Federal Signal Co.  
U. S. Electric Signal Co.  
Wood Co., Chas. N.

**Signal Systems, Highway Crossing**  
U. S. Electric Signal Co.

**Slack Adjusters**  
(See Brake Adjusters)

**Sleet Wheels and Cutters**  
Anderson Mfg. Co., A. & J. M.  
Columbia M. W. & M. I. Co.  
Drew Electric & Mfg. Co.  
Holden & White, Inc.  
More-Jones Brass & Metal Co.  
Nuttall Co., R. D.

**Snow-Plows, Sweepers and Brooms**  
Brill Co., The J. G.  
Columbia M. W. & M. I. Co.  
McGuire-Cummings Mfg. Co.

**Soldering and Brazing Apparatus**  
(See Welding Processes and Apparatus)

**Spikes**  
American Steel & Wire Co.  
Lackawanna Steel Co.

**Splicing Compounds**  
Standard Woven Fabric Co.  
Westinghouse Elec. & Mfg. Co.

**Splicing Sleeves.** (See Clamps and Connectors)

**Springs, Car and Truck**  
American Steel & Wire Co.  
Bemis Car Truck Co.  
Brill Co., The J. G.  
Standard Steel Works Co.

**Sprinklers, Track and Road**  
Brill Co., The J. G.  
McGuire-Cummings Mfg. Co.  
St. Louis Car Co.

**Steps, Car**  
American Mason Safety Tread Co.  
Universal Safety Tread Co.

**Stokers, Mechanical**  
Babcock & Wilcox Co.  
Green Engrg. Co.  
Westinghouse Elec. & Mfg. Co.

**Storage Batteries.** (See Batteries, Storage)

**Strand**  
Roebbling's Sons Co., J. A.

**Straps, Car, Sanitary**  
Holden & White, Inc.

**Structural Iron.** (See Bridges)

**Superheaters**  
Babcock & Wilcox Co.  
Power Specialty Co.

**Sweepers, Snow.** (See Snow Plows, Sweepers and Brooms)

**Switch Stands**  
Indianapolis Switch & Frog Co.  
Ramapo Iron Works

**Switches, Lock**  
Weiss Switch Lock Co.

**Switches, Track.** (See Track Special Work)

**Switches and Switchboards**  
Anderson Mfg. Co., A. & J. M.  
Electric Service Supplies Co.  
General Electric Co.  
Nichols-Lintern Co.  
Westinghouse Elec. & Mfg. Co.

**Tampers, Tie**  
Ingersoll-Rand Co.

**Tanks, Ash and Cold Storage**  
Green Engineering Co.

**Tapes and Cloths.** (See Insulating Cloths, Paper and Tape)

**Telephones and Parts**  
Electric Service Supplies Co.

**Terminals, Cable**  
Standard Underground Cable Co.

**Testing, Commercial and Electrical**  
Elec'l Testing Laboratories

**Testing Instruments.** (See Instruments, Electrical Measuring, Testing, etc.)

**Thermostats**  
Consolidated Car Heating Co.  
Gold Car Heating & Lighting Co.  
Holden & White, Inc.  
Railway Utility Co.  
Smith Heater Co., Peter

**Thread-Cutting Tools**  
Williams & Co., J. H.

**Ticket Choppers and Destroyers**  
Electric Service Supplies Co.

**Ties, Mechanical**  
Dayton Mechanical Tie Co.

**Ties and Tie Rods, Steel**  
Barbour-Stockwell Co.  
Carnegie Steel Co.  
International Steel Tie Co.

**Ties, Wood Cross.** (See Poles, Ties, Posts, etc.)

**Tool Holders**  
Williams & Co., J. H.

**Tools, Track and Miscellaneous**  
American Steel & Wire Co.  
Columbia M. W. & M. I. Co.  
Electric Service Supplies Co.  
Hubbard & Co.  
Railway Track-work Co.

**Torches, Acetylene.** (See Cutting Apparatus)

**Towers and Transmission Structures**  
Archbold-Brady Co.  
Bates Expanded Steel Truss Co.  
Westinghouse Elec. & Mfg. Co.

**Track, Special Work**  
Barbour-Stockwell Co.  
Cleveland Frog & Crossing Co.  
Columbia M. W. & M. I. Co.  
Indianapolis Switch & Frog Co.  
New York Switch & Crossing Co.  
Ramapo Iron Works  
St. Louis Frog & Switch Co.

**Transfers (See Tickets)**  
Archbold-Brady Co.

**Transformers**  
General Electric Co.  
Westinghouse Elec. & Mfg. Co.

**Treads, Safety, Stairs, Car Steps**  
American Mason Safety Tread Co.  
Universal Safety Tread Co.

**Trolley Bases**  
Anderson Mfg. Co., A. & J. M.  
Electric Service Supplies Co.  
General Electric Co.  
Holden & White, Inc.  
More-Jones Brass & Metal Co.  
National Railway Appliance Co.  
Nuttall Co., R. D.  
Ohio Brass Co.

**Trolley Bases, Retrieving**  
Holden & White, Inc.

**Trolleys and Trolley Systems**  
Ford Chain Block & Mfg. Co.

**Trolley Shoes**  
Holden & White, Inc.

**Trolley Wheels.** (See Wheels, Trolley)

**Trolley Wire**  
Roebbling's Sons Co., John A.

**Tracks, Car**  
Bemis Car Truck Co.  
Brill Co., The J. G.  
McGuire-Cummings Mfg. Co.  
St. Louis Car Co.

**Tubing, Steel**  
National Tube Co.

**Turbines, Steam**  
General Electric Co.  
Terry Steam Turbine Co.  
Westinghouse Elec. & Mfg. Co.

**Turnstiles**  
Perey Mfg. Co., Inc.

**Valves**  
Ohio Brass Co.  
Westinghouse Traction Brake Co.

**Varnishes.** (See Paints, etc.)

**Ventilators, Car**  
Brill Co., The J. G.  
Holden & White, Inc.  
National Railway Appliance Co.  
Nichols-Lintern Co.  
Railway Utility Co.  
St. Louis Car Co.

**Vices, Pipe**  
Williams & Co., J. H.

**Voltmeters.** (See Instruments)

**Water Softening and Purifying Systems**  
Scaife & Sons Co., Wm. B.

**Welded Rail Joints**  
Lincoln Bonding Co.

**Welding Processes and Apparatus**  
Electric Railway Improvement Co.  
General Electric Co.  
Lincoln Bonding Co.  
Metal & Thermit Corp.  
National Ry. Appliance Co.  
Westinghouse Elec. & Mfg. Co.

**Welders, Portable Electric**  
Electric Railway Improvement Co.  
Indianapolis Switch & Frog Co.  
Lincoln Bonding Co.

**Wheel Guards.** (See Fenders and Wheel Guards)

**Wheel Presses.** (See Machine Tools)

**Wheels, Car, Cast Iron**  
Bemis Car Truck Co.  
Griffin Wheel Co.

**Wheels, Car, Steel and Steel Tired**  
Bemis Car Truck Co.  
Carnegie Steel Co.  
Standard Steel Works Co.

**Wheels, Trolley**  
Anderson Mfg. Co., A. & J. M.  
Columbia M. W. & M. I. Co.  
Electric Service Supplies Co.  
Eureka Co.  
General Electric Co.  
More-Jones B. & M. Co.  
Nuttall Co., R. D.  
Star Brass Works

**Whistles, Air**  
General Electric Co.  
Ohio Brass Co.  
Westinghouse Traction Brake Co.

**Wire Rope**  
American Steel & Wire Co.  
Roebbling's Sons Co., John A.

**Wires and Cables**  
Aluminum Co. of America  
American Elec'l Works  
American Steel & Wire Co.  
Bridgeport Brass Co.  
D & W Fuse Co.  
General Electric Co.  
Roebbling's Sons Co., John A.  
Rome Wire Co.  
Standard Underground Cable Co.  
Westinghouse Elec. & Mfg. Co.

**Wood Preservatives**  
Lindsey Bros. Co.  
Valentine-Clark Co.

**Wrenches**  
Williams & Co., J. H.



## THE ST. LOUIS CAR CO.

*"The Quality Shops"*  
CARS St. Louis, Mo. TRUCKS

### Increased Fares

Your rolling stock is in worse condition than it has been for a long time because of the shortage of labor during the last year or two. Some new cars will be necessary to render better service to the public and the public is bound to be reconciled to an extra cent or two cents in fare if they are given better service.

There are a number of street railway corporations, and this number is steadily increasing, who have solved this problem by installing Standard Light Weight Safety Cars on their lines. These companies are not only giving service, and pleasing the public, but are showing a substantial increase in their net income.

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**St. Louis Car Company**  
St. Louis, Mo.

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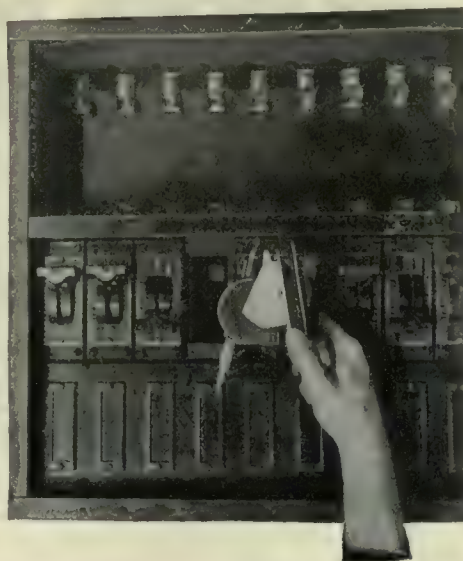
## NATIONAL RAILWAY APPLIANCE COMPANY

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### Safety with 600 Volts

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ELECTRIC

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are dangerous to life.

Provide absolute safety to em-  
ployees by using Krantz Railway-  
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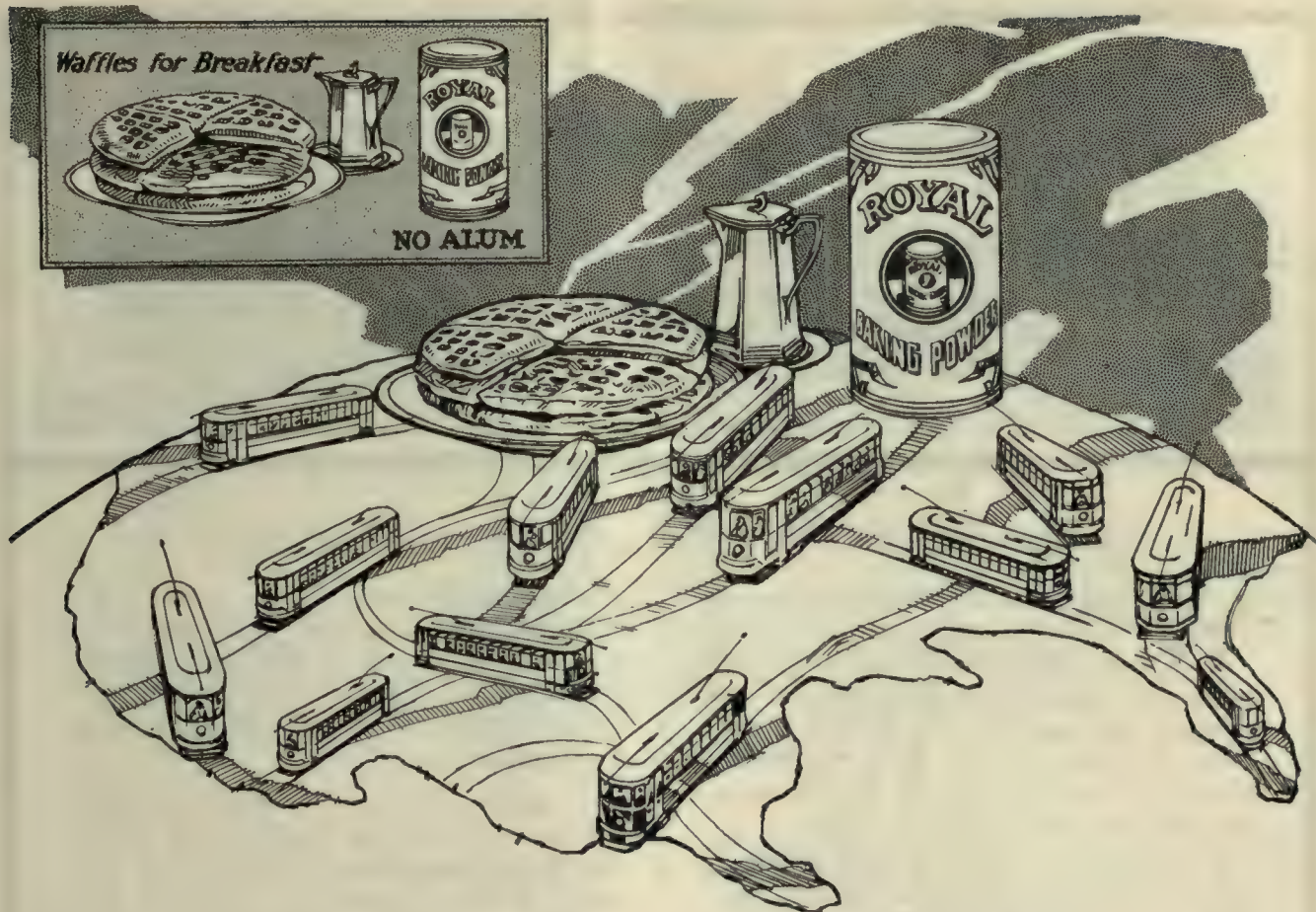


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### From Maine to California

This country has many Business Establishments maintaining a nationwide distribution of products. These Establishments are too big for the advertising contractor of limited scope to handle. Collier Service, because it is nationwide, is able to direct the advertising of such nationally used staples in the cars. The Collier organization, by intelligent, adequate service to these advertisers, assures the railway companies a stabilized income from their car card space.

**Barron G. Collier**  
INCORPORATED

Candler Building  
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## Why Peter Witt Cars Are Popular

**W**ITH quicker running time, no waiting in the street, no urging and directing from motorman or conductor, plenty of time to pay fare, no jostling and pushing in opposite directions, it is easy to see why the Front-entrance Center-exit Car is highly popular with car riders from the start.

As passengers enter, distribute themselves properly through the car, pay their fares and leave, all without a word of direction, much is added to the comfort and peace of mind of the crew—hence more popularity.

In all of the cities where these cars are in operation they are saving half the time formerly needed at terminals and princi-

pal street stops, relieving congestion that had become intolerable and allowing more cars to be put on the lines. Peter Witt Cars are, therefore, popular with railway company officials, directors and stockholders.

In addition to all its advantages for rush-hour service on heavy traffic lines and being the most convenient and all-round suitable type ever designed for double-truck service, it is readily adapted to one-man operation — locking the center doors and moving the fare box to the front platform is all that is necessary.

*Write for detailed information on the standardized Peter Witt Car*

THE J. G. BRILL COMPANY  
PHILADELPHIA, PA.

AMERICAN CAR COMPANY  
ST. LOUIS, MO.

G. C. KUHLMAN CAR COMPANY  
CLEVELAND, OHIO

WASON MANUFACTURING CO.  
SPRINGFIELD, MASS.







## Everybody Satisfied

"Sure I've figured it out. Putting on Safety Cars comes down to this—there are three parties to satisfy, the people that ride in 'em, the company that owns 'em and the men that run 'em; and I figure that what's best for one is best for all."

"I get you—it's a three-corner game. I hope the people that ride in 'em will get on to it and come across with the bigger fare. And I think they will for they certainly are strong for the Safeties and for getting there quicker and not having to wait and all that."

**I**N THE scores of cities where Safety Cars are running, the public has taken to them with an enthusiasm that proves its appreciation of the palpably modern and singularly complete scheme for its safe, quick and convenient transportation. Radically different in type and operation from what it has had, the car appeals to the public's good sense and ideals of good service.

And if the people who ride in Safety Cars are satisfied with them and the increased and quicker service their use brings them, then their satisfaction obviously produces a state of mind, a favorable attitude toward the company—good-will—that is fundamental to the success of advancing the rate of fare.

To attempt to raise the fare without improving the service is more than likely to "raise the dickens"; and if the attempt is successful, it is more than likely there will still be "the dickens to pay."

It is another case of "if eventually why not now?"; and by making the improvements before instead of after

the fare is raised, criticism will be disarmed, a large amount of antagonism overcome, and the way prepared for a graceful acceptance of the inevitable.

Not only does the Safety Car improve the quality and quantity of service in a thorough, far-reaching and distinct manner so that the public is profoundly impressed, but it offers the most practical means, from every financial and operative viewpoint, that a railway company can adopt to make its service adequate and up-to-date.

The Safety Car has shown itself equal to every situation in large cities and in small, no matter how peculiar the conditions may be.

The car men like them because they are safe and easy to handle, and because the responsibility is undivided. They quickly feel and appreciate the salutary effect of the satisfaction and good-will of the public, and soon realize that whatever benefits the public benefits the company and themselves.

THE J. G. BRILL COMPANY  
PHILADELPHIA, PA.

G. C. KUHLMAN CAR CO.  
CLEVELAND, OHIO



AMERICAN CAR COMPANY  
ST. LOUIS, MO.

WASON MANUFACTURING CO.  
SPRINGFIELD, MASS.



# The 258



## As to Temporary Overloads

### At Tacoma, Washington The G-E 258 Has Stood Up Wonderfully

"The G-E 258 has stood up wonderfully" is the unstinted praise of its users after nearly a year's experience with the operation of 13,000-lb. safety cars carrying 11,000-lb. loads or more on the stiff grades common to cities in the Northwestern Pacific district.

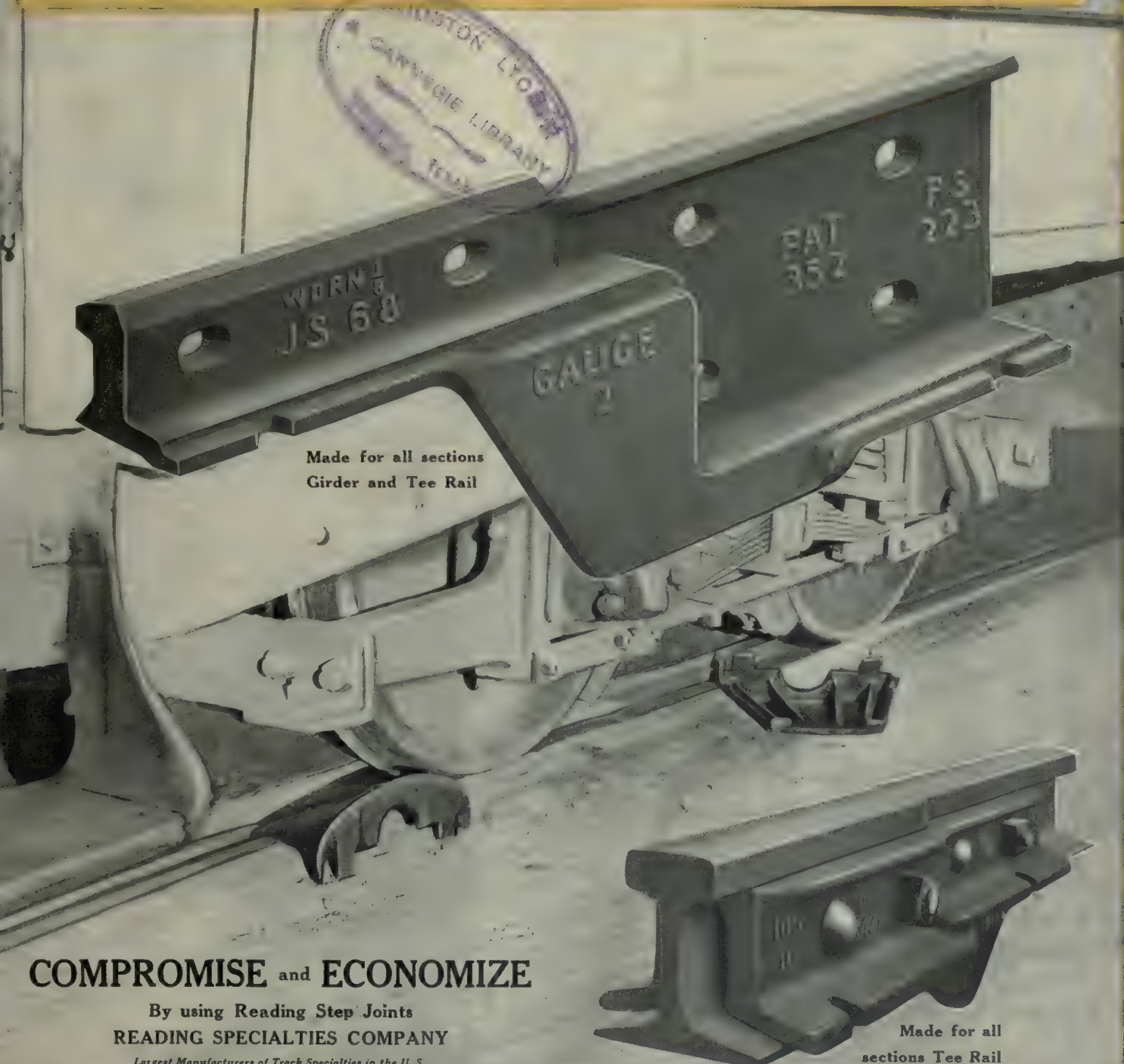
This performance shows well the reserve capacity of G-E 258 motors.

**General**  **Electric**  
General Office **Company** Schenectady, N.Y.



Annual Maintenance Number  
Special Mechanical and Engineering Edition

# ELECTRIC RAILWAY JOURNAL



Made for all sections  
Girder and Tee Rail

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sections Tee Rail



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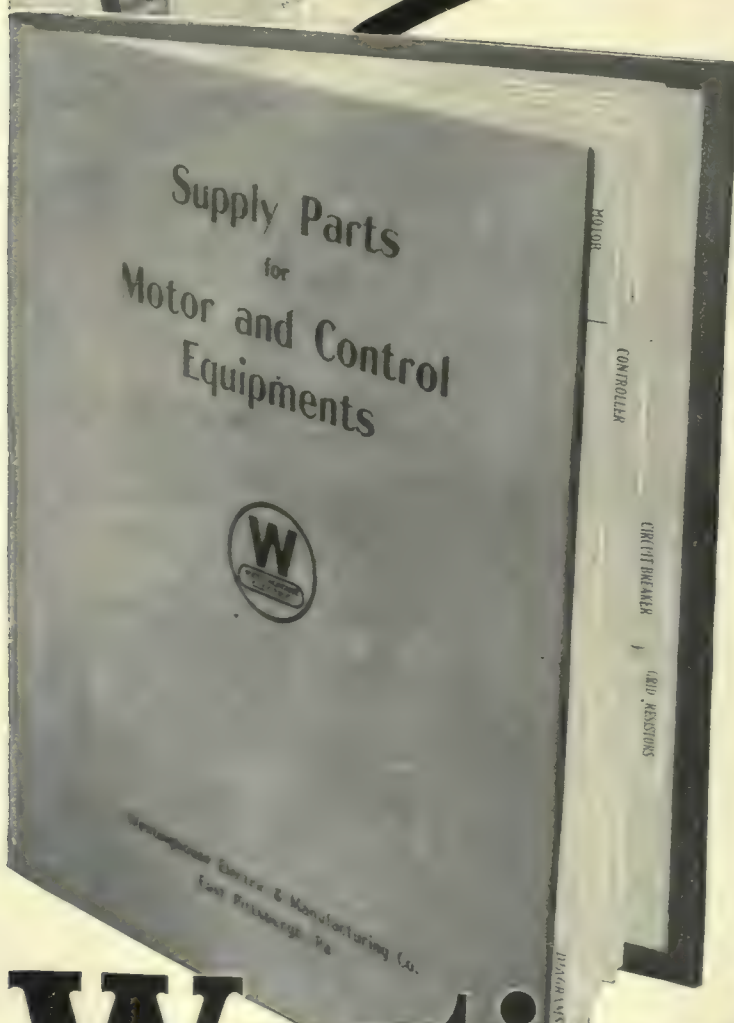
The distribution of this book is a service rendered free to all customers.

*If you do not have a copy we shall be glad to send you one.*

**WESTINGHOUSE ELECTRIC  
& MANUFACTURING CO.**

East Pittsburgh, Pa.

Sales Offices in all Large  
American Cities



# Westinghouse



# Electric Railway Journal

H. W. BLAKE, Editor

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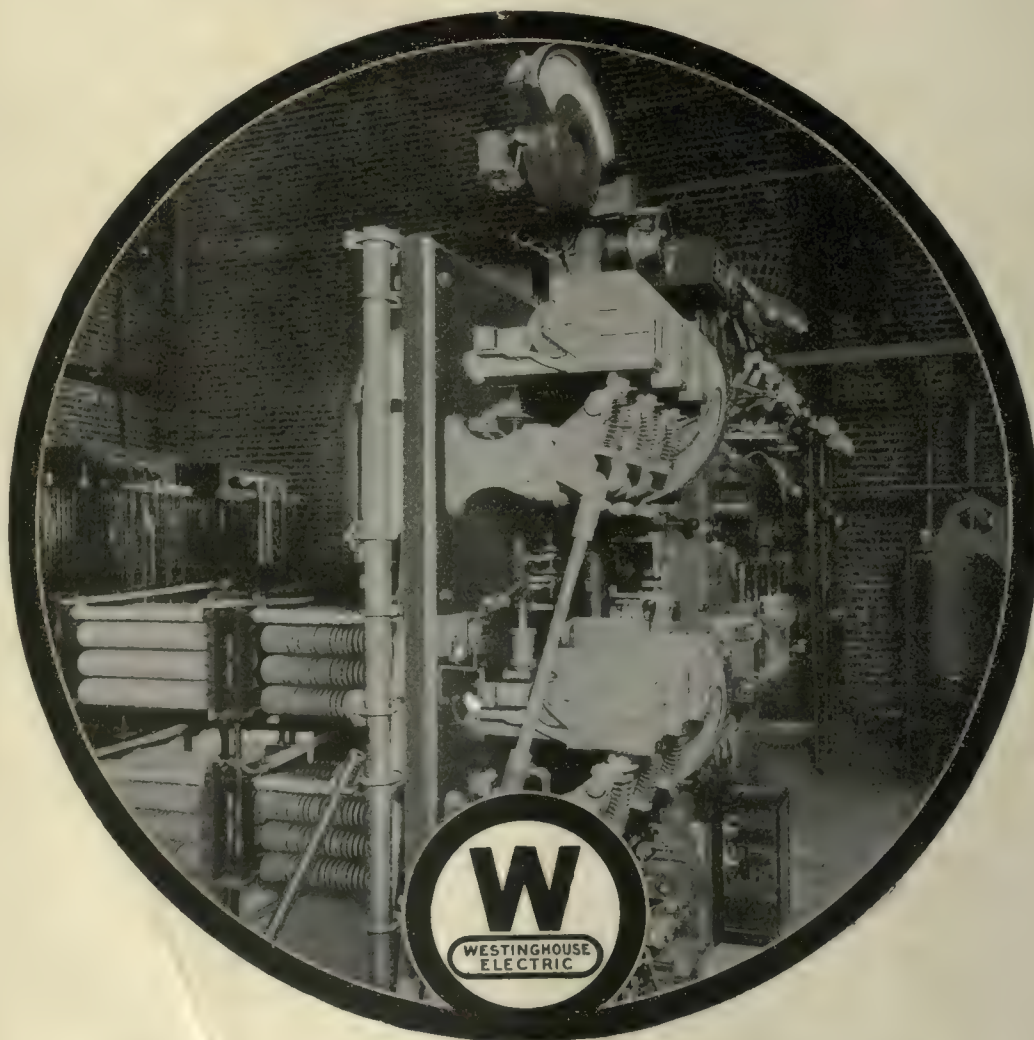
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# Automatic Substation Switching Equipment

Its great economic value has been  
amply demonstrated in actual operation.



It means substantial savings in operating cost, substation losses, feeder losses, feeder copper, electrolysis difficulties, etc.

While one automatic substation equipment may prove to be a substantial asset, larger

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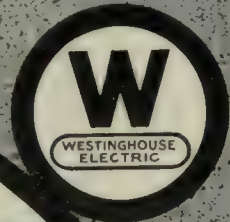
The services of our corps of experienced application engineers are freely at your disposal to make a study of the possibilities on your system.

Westinghouse Electric & Manufacturing Company  
East Pittsburgh, Pa.

# Westinghouse



# Type U Trolley Wire Splicer

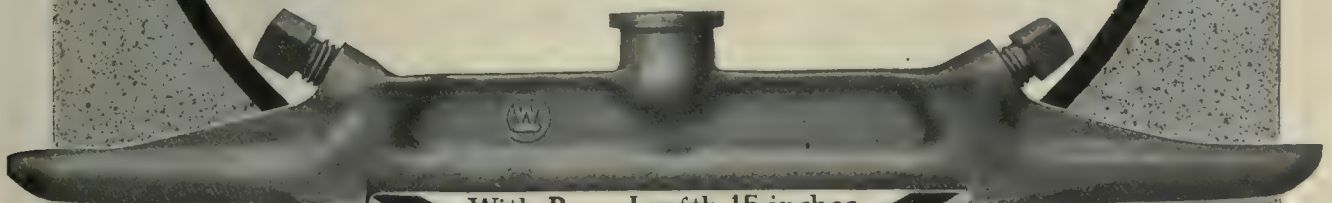


Without Boss—Length 10 inches

The Type U is an improved form of splicer similar to the Clarke, except heavier throughout. It is stronger than any trolley wires which can be connected by it. It has the same under-run as the Cleveland Trolley-Wire Splicer.

The lips are thickened on the outside where they encircle the wire, so that when clinched around the trolley wire, the thick lips fill up the space caused by the bend of the wire.

Westinghouse Electric & Manufacturing Company  
East Pittsburgh, Pa.



With Boss—Length 15 inches

See Line Material and Rail Bond Catalogue No. 6-A.  
Order by Style Number

# Westinghouse



# Westinghouse

## RAILWAY OPERATING DATA

### Brushholders

To be able to care for the brushholders of railway motors intelligently it is necessary to be familiar with the construction and purpose of their parts. In repairing and replacing a modern railway motor brushholder of the insulated pin type, the following points should be considered:—

#### INSULATION CLEARANCE

(Shortest Distance from Live Parts to Ground)

A section through the clamping pin where the brushholder is clamped to the motor frame is shown in Fig. 1, illustrating the method of insulation. The brushholder castings should have at least three-quarters of an inch air clearance from the motor frame.

#### INSULATION CREEPAGE

(Distance of Live Parts from Ground Along the Surface)

The porcelain insulators, Fig. 1, give sufficient creepage distance over smooth corrugated surfaces to keep the brushholders from becoming grounded to the frame and should always be kept tight on the pin by putting pieces of hard paper between the porcelain and tube, and cleaned of carbon dust and dirt to prevent current from leaking over the surface.

#### CORRECT SPACING OF BRUSHHOLDERS

(Alignment for Neutral)

Railway motor frames have machined pads for the clamping blocks to hold the brushholders exactly in the neutral position.

carbons. Other factors that govern this pressure are the amount of sparking, the play in the armature bearing and the track conditions. Usually a simple means of adjusting the pressure is provided, as shown in Fig. 3.

#### CARBON BOX CLEARANCE

To prevent breakage and side wear of the carbon, it should fit in the box as snugly as possible without binding. This clearance should not exceed one thirty-second of an inch.

#### SHUNTS

The shunt formerly used on the carbon has been replaced by a shunt on the brushholder which connects the contact tip on the finger and the main casting. This shunt must be large enough to carry the current and make a good electrical contact where fastened. It may be brazed, soldered or riveted, as shown in Fig. 2. If a good electrical path is furnished for the current through the shunt, much of the side wear of the carbons and burning of the carbon box is prevented. Therefore it is very important to keep the shunts in good condition.

#### CONTACT TIPS

The object of the contact tip is not only to transmit the pressure to the top of the carbon, but to conduct current from the carbon or from the carbon to the shunt. Its

### Announcement

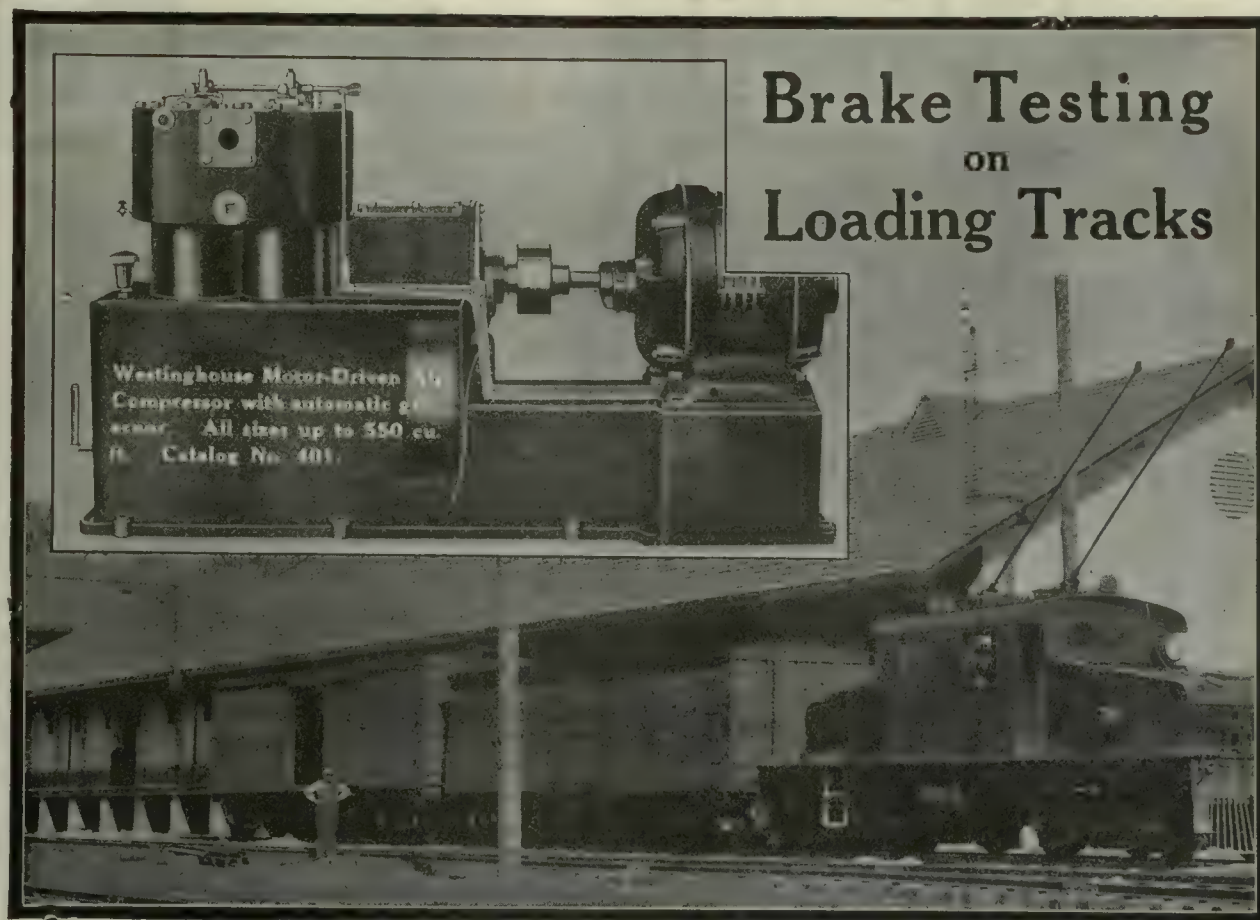
"Railway Operating Data"  
is now ready for general distribution. Each leaflet covers helpful suggestions and information on the  
**Maintenance of Railway Equipment**

Write to our nearest district  
office for a full set of  
these leaflets



**Westinghouse Electric & Manufacturing Co.**  
East Pittsburgh, Pa.





## Brake Testing on Loading Tracks

Westinghouse Motor-Driven Air  
Compressor with automatic  
control. All sizes up to 550 cu.  
ft. Catalog No. 401.

Cars being loaded on freight house tracks offer an excellent opportunity for the inspector to test and condition the air brakes before the cars are switched into the train and sent on their journey. Train detentions, due to neglected air brakes, will be largely reduced if an air compressor be installed in the freight house and the loading tracks be piped to carry air to the cars.

### Westinghouse Electrically-Driven Air Compressors, Being Compact, Efficient and Durable,

are specially suited to air brake testing plants of all kinds and sizes, and particularly to those isolated plants which require compressors automatically controlled, of thorough reliability, and which need little attention to operate and maintain.

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Mexico City  
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Pittsburgh, Pa.

San Francisco.  
Seattle, Wash.  
St. Louis, Mo.  
St. Paul, Minn.



# Winning the Pub

---

## Where



The greatest problem now facing the Electric Railway Industry is too well known to need elaboration. It is that of increasing the cordiality of public relations—to demonstrate to the public, beyond the shadow of a doubt, that *more* and *better* and *safer* transportation service is being rendered *now* than formerly, and that the increase in revenue asked is logical and fair. That is one reason why the SAFETY CAR idea is sweeping the country. Every spot on the above map represents the location of a company which, with Air Brake and Safety Car Control Equipment applied either to *new* cars or to large or small cars now in service, is rendering those cars Safety Cars, and gaining thereby all the operating advantages thereof.

# SAFETY CAR

---

Home Office: Boatmen's Bank Bldg., St. Louis

Chicago: Railway Ex. Bldg.

## with the Service



# Public's Good Will

## How



Everett, Wash.

Tacoma,  
Wash.

Bellingham, Wash.



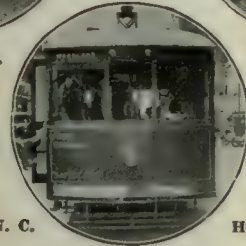
Beaumont, Texas



Tampa, Fla.

El Paso,  
Texas

Greensboro, N. C.



Houston, Texas



Fort Worth, Texas



Austin, Texas

How does the Safety Car gain the public's good will?

By making possible headways hitherto impossible in small cities and towns.

By increasing schedule speeds.

By making it just as convenient and a good deal *safer* than using the jitney or private automobile.

By making it easier to get off and get on—due to the low steps.

By eliminating step accidents.

By making mid-day travel and afternoon shopping travel safe and fast and pleasant.

By attracting a *better class* of conductors.

By providing for the safety and convenience of the very young and the aged.

All these factors are powerful arguments *in your favor for increased fares, with Safety Car Equipment.*

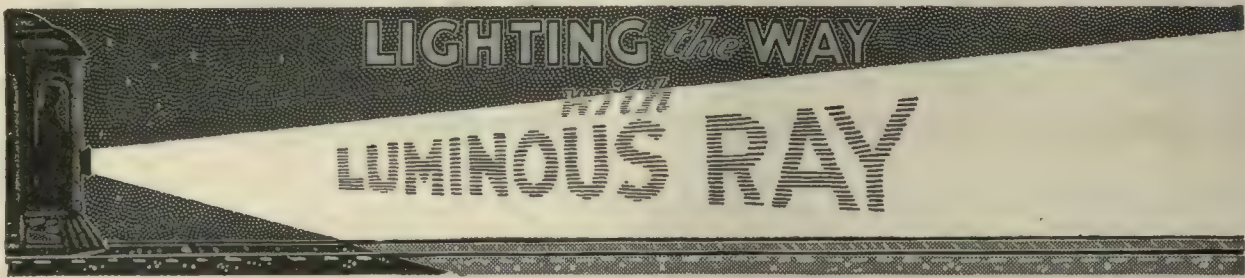
# DEVICES CO.

Pittsburgh: Westinghouse Bldg.

New York: City Investing Bldg.

# of the Safety Car





Crouse-Hinds Imperial Luminous Arc Headlight on High Speed Freight Train.

## Imperial Luminous Arc Headlights

### *Powerful Light*

A strong light even on very low voltage is one of the fundamental characteristics of Imperial Luminous Arcs. When the motorman starts up for a quick getaway the inside lights may dim—but this headlight stays steady and bright.

When the car is near the end of the line the voltage may be very poor—but the Imperial Luminous Arc projects the same safety-bringing beam.

### *Scant Care*

An airtight partition divides the case of the Imperial Luminous Arc. In the front half are the electrodes. In the back—safe from fumes and deposits—is the mechanism. Naturally this protected mechanism requires little attention.

The two compartment feature is only one instance of the way design has forestalled maintenance in Imperial Headlights.

**THE OHIO BRASS COMPANY, Mansfield, Ohio**

New York   Philadelphia   Chicago   Pittsburgh   Los Angeles   San Francisco

*Exclusive Sales Agents in the U. S. for Crouse-Hinds Imperial Headlights.*





# PRODUCTS

*Quality First*



O-B Trolley Retrievers and Catchers

## For the Good of the—

### Overhead

Even if a "wild" pole does not pull down a span or two, it strains the line and loosens things generally.

O-B Retriever (for high speed) catches the pole and pulls it down below the span. O-B Catcher (for city service) catches the pole and permits no "stepping-up."

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Few, sturdy parts—simple, rugged mechanism keeps O-B Retrievers and Catchers out of the shop and on duty. If repairs are necessary the parts are perfectly interchangeable in each device.

### Trainmen

O-B Catchers and Retrievers are always ready. They relieve your conductors. Only one way to set O-B Catchers and Retrievers and that way is easy.

*Try them on your road at our expense*

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Chicago

Philadelphia  
Los Angeles

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San Francisco





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STEEL TWIN TIES

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This job was speeded up 100 per cent. by using International Steel Twin Ties—labor of removing old foundation was entirely eliminated.

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Rehabilitating  
double track  
on Broadway,  
Cleveland, Ohio

# The International Steel Tie Company

Manufacturers of Steel Twin Ties and Crossing Foundations

General Sales Office and Works: Cleveland, Ohio



Stop the destructive twisting  
that breaks filler blocks and  
bolts.

### INTERNATIONAL STEEL CROSSING FOUNDATIONS

provide a resilient and extensive bearing that reduces maintenance and prolongs frog life.

The 1½-foot wide tamping surface of the sturdy box girders multiplied by every foot of running rail in the crossing equals more square feet of effective bearing than can be obtained in any other way. Users are saving 75 per cent on maintenance and doubling life of crossing frogs.

*Have your drafting department mail us sketch of your hardest worked crossing today.*

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Manufacturers of Steel Twin Ties and Crossing Foundations

General Sales Office and Works: Cleveland, Ohio



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SIGNAL SYSTEM**



*"A pleasure for the passenger as well as the car maintainer."*

★ **KEYSTONE ROTARY GONGS**



*"Clear the track for speedy and safe car operation."*

★ **"GOLDEN GLOW"  
HEADLIGHTS**



*"As easy to maintain as they are efficient in illumination."*

★ **KEYSTONE  
TROLLEY  
CATCHERS**



*"They keep the operator on the car."*

★ **KEYSTONE  
AIR SANDERS**



*"The able little brother of the airbrake."*

★ **KEYSTONE ILLUMINATED  
DESTINATION SIGNS**



*"By their signs ye shall know them for real sellers of transportation."*

**KEYSTONE STEEL GEAR CASES**



*"Withstand vibration and the hard road bed knocks in service."*



# Keystone Specialties are Standard on Thousands of Cars

The wide adoption of this car equipment by so many electric railway companies is a stamp of approval of great value to you.

Practically every railway "from Coast to Coast" is using some of these specialties.

Many are using all of them.

Birney Safety Cars use six of these specialties as standard equipment. This equipment has done a lot to assure the success of the safety car. It is noted on opposite page with stars.

This great stamp of approval should be sufficient testimonial. Never hesitate to adopt a Keystone Specialty as standard equipment.

Complete data on any or all of them sent on request.

**KEYSTONE  
LAMP GUARDS**



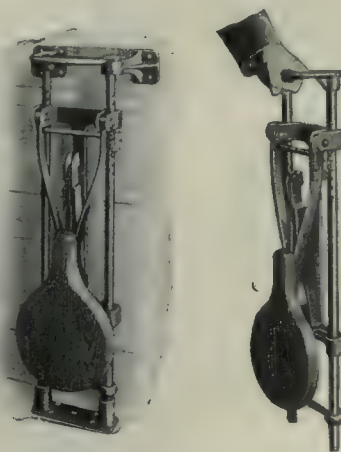
*"Stronger than the men  
who use them."*

**THE AUTOMOTONEER**



*"It Controls the Controller."*

**KEYSTONE  
MOTORMEN'S SEATS**



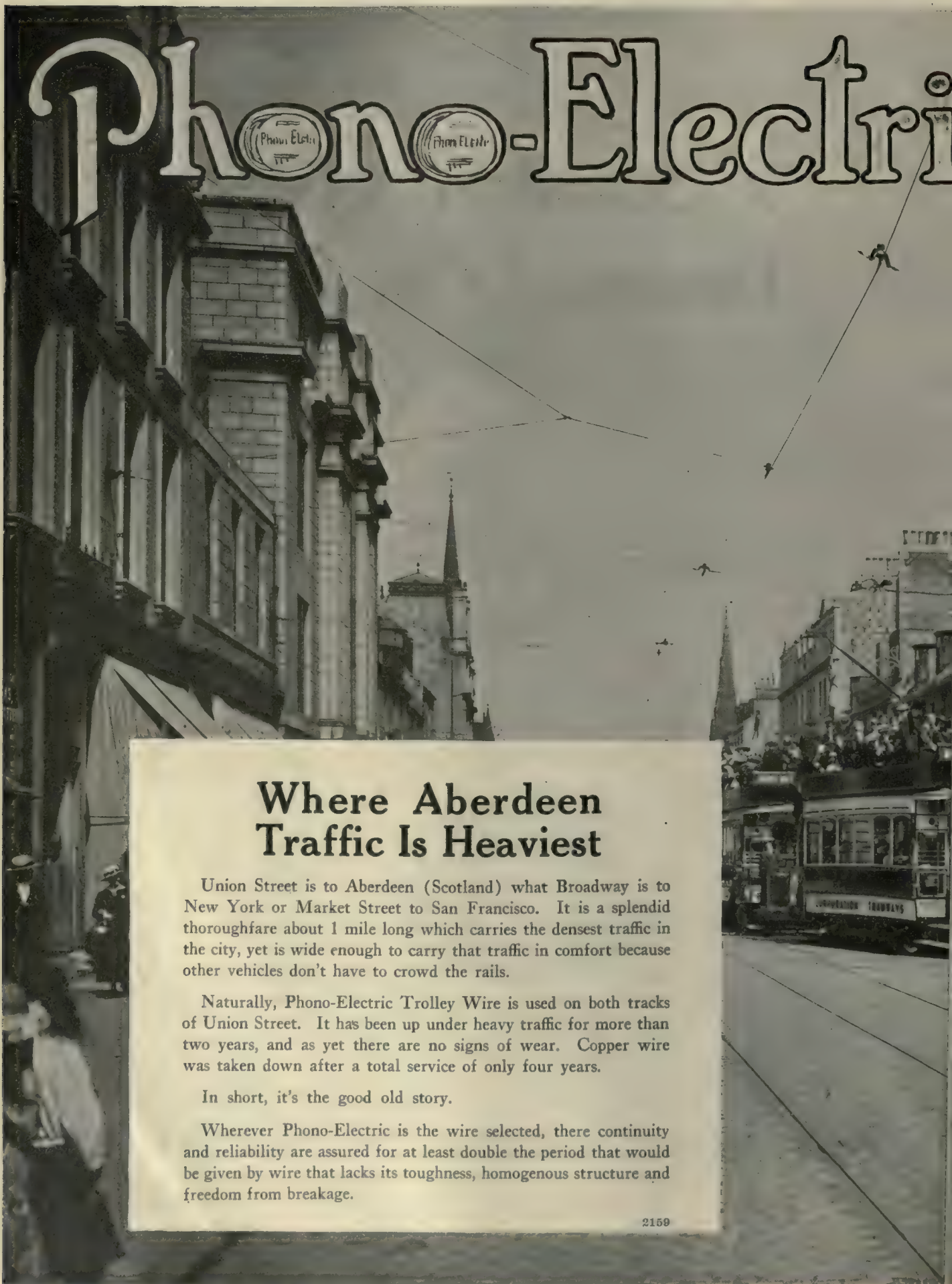
*"Portable and of Great Strength."*

## ELECTRIC SERVICE SUPPLIES Co.

*Manufacturer of Railway Material and Electrical Supplies*

<b>PHILADELPHIA</b>	<b>PITTSBURGH</b>	<b>NEW YORK</b>	<b>CHICAGO</b>
17th and Cambria Streets	337 Oliver Building	50 Church Street	Monadnock Building





# Phono-Electric

## Where Aberdeen Traffic Is Heaviest

Union Street is to Aberdeen (Scotland) what Broadway is to New York or Market Street to San Francisco. It is a splendid thoroughfare about 1 mile long which carries the densest traffic in the city, yet is wide enough to carry that traffic in comfort because other vehicles don't have to crowd the rails.

Naturally, Phono-Electric Trolley Wire is used on both tracks of Union Street. It has been up under heavy traffic for more than two years, and as yet there are no signs of wear. Copper wire was taken down after a total service of only four years.

In short, it's the good old story.

Wherever Phono-Electric is the wire selected, there continuity and reliability are assured for at least double the period that would be given by wire that lacks its toughness, homogenous structure and freedom from breakage.



# c Trolley Wire



Bridgeport Brass Company  
Bridgeport Connecticut



# Northern White Cedar Poles



## For All-Round Service

Northern White Cedar Poles have proven their value in every type of line construction. Long life, strength and ease of handling are features which make these poles the choice of engineers for railway, power, light, telephone and special construction.

No. 1. Northern White Cedar Poles on the line of the Grand Rapids Railway Co. between Grand Rapids and North Park, Michigan. Poles are 30 ft., 8-in. top, and have been in the line for 21 years.

No. 2. Shows a section in a line of 56 miles of Northern White Cedar Butt-Treated Poles of the Fort Smith Light and Traction Company, Fort Smith, Arkansas. 35 and 45 ft., 8-in. top poles are used in this stretch.

Nos. 3 and 4 are further views on the 56-mile run at Fort Smith.

**Northern White Cedar Association**

Lumber Exchange, Minneapolis, Minn.





## An Informal Message to You From Burton Mudge, President Mudge & Company

*I have just written a letter to an official of your road. It will reach him some time within the week. This subject is one that you will view with importance.*

### This Is The Situation

For over ten years we have been furnishing Mudge gasoline Section and Inspection Motor Cars to steam railroads. Today there are over 25,000 cars of all makes in operation, paying big dividends to their users. What we feel is that you, too, can use them advantageously on your mileage which is outside of the city limits. There is some difference in your manner of operation, however, which we have taken into consideration. Just because we want an unbiased opinion from you covering the pros and cons is the reason for our having written to you. We are of an open mind and will be just as receptive to a decision that you cannot use cars as that you can.

### The Cost And The Uses

A light (one to three man) Inspection Car, such as used by Superintendents, Roadmasters, Track Inspectors, Signal Maintainers or for "Trouble Shooters" to run out over your line when the power is off, would cost less than \$200. The approximate cost of the Section or Gang Car is slightly more. You would use this latter car for hauling material and men. Not having to pump hand cars, your men can do more and better work when they arrive on the job. You will not need to run work trains so often, or, in case your laborers are now using your passenger service to arrive at their work, you surely have a situation which you wish to overcome. The picking up and dropping off of a gang of sweaty, dirty laborers, I am sure you feel is an annoyance to your traveling public, and surely this system does not permit of their carrying much desirable or necessary material.

### Last Year Was A Motor Car Year

As you have undoubtedly noticed, we have been carrying advertisements in this publication for the past year. It has been a big year of Motor Car Purchases for steam lines, but the motor car purchases of the electric lines have been nowhere near proportionate to those of the steam lines. Your opportunity for saving seems almost as great through motor car use. From the investigation we have made thus far, there are 162 cars in use on 34 out of the 300 lines we have heard from. The number of cars in use on each line varies from 1 to 25.

### To Return To Our Letter

If you are the official to whom our above-mentioned letter is addressed and you are interested in the subject, well and good; if we should have addressed another official on this subject please pass the letter on to the proper party for reply. We will be your clearing-house for motor car information. When the data is received, we will boil it all down and present it to you for your consideration. We ask your hearty co-operation in this effort to do you a service.

# mudge motor cars

MUDGE & COMPANY, Railway Exchange, Chicago, Ill.





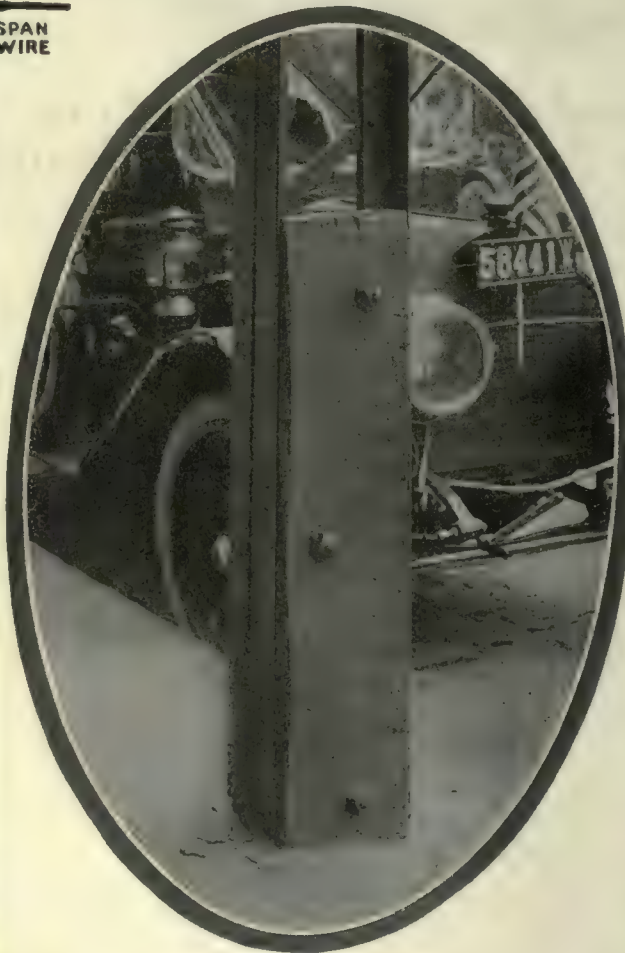
# "ELRECO" TU for Permanent

## Steel Poles that make good under all conditions

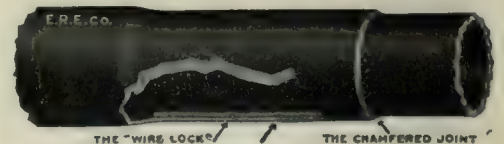
The keynote of rehabilitation is *permanent construction* rather than cheapness. The illustration shows the evils of deterioration. Pole corrosion such as that pictured on this page is expensive and pole failure may bring damage claims as well as lowered prestige in the eyes of an already too-critical public.

Hundreds of thousands of "ELRECO" Tubular Steel Poles are in use today by electric railways and jointly by electric railway, power, light and telephone companies in all parts of the country.

SPAN  
WIRE



Eliminate This Loss



# ELECTRIC RAILWAY

Cincinnati,

New York,



# TUBULAR POLES Construction

## Tubular Steel Poles that do quadruple duty

They have made good at all times, as the Best poles, under all conditions.

"ELRECO" Combination poles are straight, graceful, strong poles for trolley, power, light and telephone service combined. "ELRECO" poles are being installed in many of the most beautiful and progressive cities in America. They stand all service strains.

## The Joints Are Stronger Than the Pole

You can safely load them up from any direction, save installation and maintenance costs, and conserve street space.

All orders for these poles can be filled *promptly*, as our usual pre-war steel tonnage is again available.



Achieve This Saving



# EQUIPMENT CO.

Ohio

30 Church St.



# WESTERN RED CEDAR POLES



## Western Red Cedar Poles for Universal Service

Scene in larger picture is of one of the Kansas Gas & Electric Co. lines looking east on Second Street from Market in Wichita, Kansas.

60-ft. Western Red Cedar Poles carry 9—2/0 wires, 7—4/0, 3 No. 4 and 6 No. 6 wires, and 3—500,000 c.m. cables.

Trolley line insert shows a span wire construction on the Detroit United Railway on 7-mile Road at Woodward Ave. 50-ft. Western Red Cedar poles carry 4—500,000 c.m. cables, 1—1,000,000 c.m. cable, 3 railway telephone lines, 2—2/0 round trolley wires, 2—4000-volt 3-phase lines, 1 arc circuit and 1 ground wire.

**Western Red Cedar Association, Peyton Building, Spokane, Washington**

*Butt-Treating Will Give Many Years of Added Service. Ask Your Dealer.*



# WESTERN RED CEDAR POLES



## Western Red Cedar Poles at Roanoke, Va.

The line of poles in the main picture is located at Roanoke, Va. These *Western Red Cedar Poles*, which were set only a few months ago, are 55 feet and 60 feet long. They carry directly from the power station both the 500-volt feeders of the railway and the 2300-volt primaries of the light and power department. For part of the way also they carry the company's private telephone wire. The straightness and strength of these poles are a source of satisfaction now. Their dur-

ability will be a source of satisfaction for many years to come.

### ALSO IN INDIANA

The small view shows a line of strong, straight, slightly *Western Red Cedar Poles* doing good service along the right of way of the Fort Wayne & Northern Indiana Traction Company of Fort Wayne, Indiana. *Western Red Cedar Poles* are rendering highly satisfactory service in all parts of the country.

WESTERN RED CEDAR ASSOCIATION, Spokane, Washington



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# Electric Railway

## *fixing-up time*

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**BEFORE THE BUSY SEASON** begins there are permanent repairs to make where the emergency man rendered only first aid with promises.

**MAINTAINING SCHEDULES** makes it imperative that the promises be fulfilled; otherwise **THE POWER CIRCUIT**, the circulation of the energy of the system, may develop a case of high blood pressure. Ask your life insurance man what this means. Poor condition, days off now and then, enforced vacations and possibly something worse; therefore it means a poor risk.

**POOR RAIL BONDS** impair the power circulation; poor lights, slow travel, a burnt out armature now and then and possibly a shut-down due to heart failure.

## *The ERICO System*

of bonding is a health habit and not a health trip. Two men follow after the section gang with a small light portable outfit and pick up the gaps.

The Pittsburgh Railways Co. recently reported 17 bonds installed in 52 minutes on double track pick-up work with 3 minute traffic,—the bonders having had about 2 weeks' experience.

Remember that the ERICO welded terminal bond is the best bond made.

*For full information address*

**The Electric Railway Improvement Co.**  
Cleveland, Ohio

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# Little Giant Track Drills

**Help You Keep Track Upkeep Down!**

This is the Little Giant Track Drill (standard type), built for rapid work in rail bonding, drilling tie and joint holes, and for reaming joint holes. Note that the frame does not *bolt* to the track; it simply *hooks* over the rail to be drilled, the operator holding down the other end by sitting on the seat provided. Other features provide for the quick, simple application and operation of the drill for *any* nature of track drilling work.

These are times for *super* efforts toward labor conservation. You are losing money on every track drilling job you handle without Little Giant Track Drill's aid!

Built in two sizes for maximum drilling of 1 in. and 1½ in. holes. *Ask for literature.*

The Little Giant Track Drill is just one of a *family* of portable electric labor-savers. There are Little Giant Portable Electric Grinders, Portable Electric Spike Drivers, Portable Electric Hammer Drills, etc. Write for complete illustrated Bulletins.

**Chicago Pneumatic  
Tool Co.**

1062 Fisher Bldg.  
Chicago, Ill.

*Five Little Giant Electric Track Drills reaming joint holes on the tracks of the Pittsburgh Railways Co. These five are part of a big battery of Little Giant Portable Electric Tools, saving time, labor and money for this prominent user.*





# Economy

**W**HAT do your records show on the cost of wheel maintenance?

How many wheels were removed because of slid-flats, chipped and broken flanges?

How many wheels were removed for turning?

Figure the cost of removing wheels, of car delays, of low mileage; the cost of turning wheels, of taking cars out of service, of wheel lathes and other shop equipment.

Then figure the service per dollar given by the Davis Steel Wheel.

The excessive costs of slid-flats, chipped and broken flanges are erased from the records, as the rim of the Davis Wheel is tough as well as hard.

Records on the expense of turning wheels to obtain full mileage are eliminated, for the Davis Steel Wheel gives full mileage on one-wear.

The Davis Steel Wheel will lighten your wheel problems.

## American Steel Foundries

NEW YORK

CHICAGO

ST. LOUIS









# Any GOOD Device Consumption Pro



But let us see some of the advantages of the Arthur Recorder. These advantages are not mere theories, they can be substantiated by the solidest kind of facts by proven results in dollars and cents on large scale properties.

Why should a road choose the Arthur Recorder?

*First*—Because it talks the language of the motormen. It measures the power—and (note this for it is important) it measures it in terms that the motorman understands—minutes. If you wanted to save gas on a gas range you would turn off the gas. This is simple and natural, and in the same way if you want to save power on a street car, encourage the motorman to shut it off by recording the minutes he has the power on.

*Second*—It encourages legitimate coasting without holding off the brakes until the last second each time, nor does it encourage the motorman to take chances by coasting to excessive speed on steep down grades. Instead

**In one large city using 300 Arthur Recorders the following results were obtained:**

**After six months' use 12.4%**

reduction  
in k.w. hours  
per car mile.

**After eighteen months' use 23.6%**

reduction  
in k.w. hours  
per car mile.

Other cities using a later improved model have shown even better and quicker results.

## THE ARTHUR POWER

Second National Bank



# for Checking Power duces Big Savings

of this it encourages him to shut power off. This is the natural way to save power and is also the safest method of operation.

*Third*—The motorman has faith in the Arthur Recorder for the reason that he understands it easily. If necessary he can check it up with his own watch at any time. This appeals to him and gets his co-operation.

*Fourth*—It requires but little clerical work to follow up the records. Its simplicity in this respect is relatively as great as are the mechanical features of the instrument itself.

*Fifth*—Where desired its figures can be used as a basis for arriving at car inspection, so doing away with the cost of obtaining individual car mileages. Cars can be inspected on a "service" rather than on a mileage basis where found desirable.

*Sixth*—Here is an important financial fact. Since it costs comparatively little and saves a great deal, it follows that it will pay for itself on any property in a very short time. In practice it will save its cost in from two to three months on any ordinary property.

*Seventh*—You don't have to buy Arthur Recorders. If desired we rent them on easy terms and allow the full amount of the rental payments to apply on the purchase price. The instruments therefore automatically become yours after a certain time—about a year or so.



**The Arthur Recorder Measures and Records in minutes the time during which power is kept on the car; simple and perfectly understood by motormen.**

## SAVING RECORDER CO.

Building, New Haven, Conn.





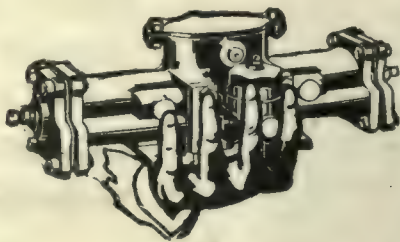
The New Home of the National Pneumatic Company

# National Pneumatic Door and Step Control A Standardized Product yet it meets widely varying conditions

The physical and operating problems met in pneumatic door and step operation are rarely the same on any two properties. Intense specialization and wide experience in this field have enabled us, however, to originate apparatus so simple and adaptable that our pneumatic equipment will permit the operator himself to meet wide variations in

**Air Pressure, Number**

**of Stops, Summer and Winter Temperature. Weights of Doors and Steps, Speeds of Opening and Closing, Location and Number of Doors and Steps.**



Existing cars that already have air brakes and new cars that are going to have air brakes can be equipped with National Pneumatic Door and Step Control at modest cost. We are at your command.

## NATIONAL PNEUMATIC COMPANY

INC.

50 Church St., New York

Rahway, N. J. Chicago, Ill.







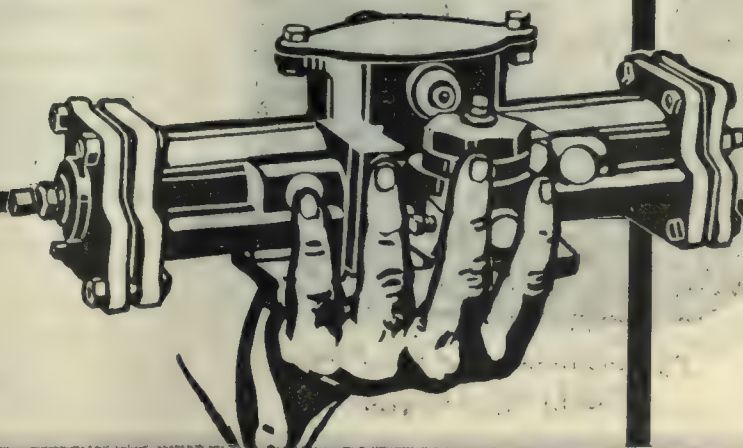
## With National Pneumatic Equipment You Can Secure Better Collection of Complex Fares

No matter what kind of fare collection you adopt—increased flat unit or zone—the simple 5-cent piece is going to go.

If your conductor had his troubles with the 5-cent fare, you can conceive how much more he is likely to have with the handling of odd fares. Hence, unless he is afforded every possible relief from other duties, more fares will be missed and more car-hours will have to be paid for.

National Pneumatic equipment *does* afford a large share of this relief. The doors and steps can, if necessary, be closed merely by stepping on a pedal, and the starting signal to the motorman can likewise be given by the very closing of the doors—so that the hands of the conductor can, at all times, remain free for the collection of fare.

Make your change to National Pneumatic Door and Step control simultaneous with your change in fare practices if you want to introduce the latter to employees and passengers under the most favorable circumstances.







*On the Pullman Cars*

# ECONOMY METERS ARE



**"The Watchdog of Your Power"**  
Sold or Leased

The ECONOMY Railway Meter is a rugged, time-tried device. Its element has the same design as that of the meters which control the lighting equipment on all the cars of the Pullman Company and on several steam railways, and on battleships and submarines of the U. S. Government. It is standard on the electric trucks of nearly all manufacturers of electric vehicles. It is widely used wherever there is need for an electrical energy-measuring device that has demonstrated its ability to withstand punishment.

The electrical characteristics of The ECONOMY Meter are guaranteed. Service Records show that the cost for maintenance, definitely established over a period of three and a half years, is not more than \$1.00 per meter per year.

## **ECONOMY ELECTRIC**

L. E. GOULD,

*Exclusive Sales Agents: Sangamo Economy*

New York Office.  
Wetmore-Savage Co., Boston, Mass. Burton R. Stare Co., Seattle, Wash.  
Henry J. Schiefer & Co., Rochester, N. Y. L. A. Nott,



*On Submarines**On Battleships*

## RUGGED "POWER-SAVING" DEVICES

Continuity of service from a "power-saving" device is a big factor in sustaining the interest of the motorman.

**ECONOMY** Meters on your cars will bring about lower energy consumption.

The **ECONOMY** Meters induce saving by a method which does not encourage practices contrary to "safety first."

They will more than pay for themselves the first year of operation.

The **ECONOMY** Meter has no paper tape rolls to keep filled; no ink supply to maintain; no clock mechanism to rewind, oil and adjust; no fuses to blow and be replaced; no relays to stick or to burn out; no pneumatic

plungers to be kept in such condition that they will function uniformly; in fact, it has no parts that are ever differently affected by wet, dry, hot or cold weather conditions, water or scale in the brake system. Maintenance work on Economy meters can be done as a bench job—no need to hold cars out of service while making repairs.

**Let us send you further details. Write for our booklet on Efficient Electric Railway Operation.**

*On Motor Trucks*

## DEVICES COMPANY

*President*

*Railway Meter, Old Colony Bldg., Chicago*

50 Church St.  
Ludwig Hommel & Co., Pittsburgh, Pa. Rumsey Electric Co., Philadelphia, Pa.  
San Francisco, Calif. J. G. Monahan, Los Angeles, Calif.



An active interest has been created in the improvement of work cars for handling materials and the shortage of men has done more than anything else to direct attention toward the need for reduction in men used in this branch of the work. Until recently most bulky material, such as paving blocks, sand, gravel and crushed stone, were handled by men, who loaded the material onto ordinary flat cars at the yards and unloaded it again at the job. Sometimes the men were transported with the load, where there were none available at the point of unloading. From eight to ten men are usually required for this sort of work.

There was a time, not long ago, when any old collection of junk on wheels was considered good enough for a work car. In that day the way engineer who asked for specially designed work-car equipment was apt to be considered somewhat crazy. The development of the automatic side-dumping car has changed all this, much to the advantage of the companies. It is now possible to unload a 3-car train of automatic dump cars with one man, where six or eight were formerly required by such cars. The whole trainload can be dumped in from 3 to 5 min. where it formerly required about 20 to 30 minutes per car. Such equipment has further advantages in the saving of time of the equipment on the road, in lessening of tie-up of passenger car traffic while unloading between cars under regular service conditions, and in availability for use in general revenue freight service in hauling material for highway contractors as well as in the railway coal service.

It has been authoritatively stated that automatic dump-car equipment has saved as much as 30 cents per foot in the cost of track work in a large city in the Central West.

Read these  
authoritative  
words of a  
well-known  
Engineer of the  
Department  
of Ways and  
Structure



then ↘

—look at the type of  
cars he refers to →

## THE DIFFERENTIAL Electric Dumping Car

*Need we add more?*

Differential Car Co., Inc.  
141 Broadway, New York





# American Troops Entered Los Angeles In 1846



Contrast in your mind the condition of the little hamlet at that time as shown in the above illustration, with the great busy city of today.

And then consider that the foundation of the transformation from a quiet little village sleeping in the California sunshine to an energetic center of hustling commerce has been cemented by the advantages that spring from adequate modern transportation methods.

The great transcontinental railway lines that link Los Angeles with every section of the country, the efficient street railway cars that carry its citizens rapidly to and fro in their daily pursuits, the converging interurban lines with their sixty-mile-an-hour cars that tap the country for miles around bringing produce and trade, are nearly all served by

## Galena Oils and Galena Service

Adequate rapid transit service has been a big factor in the upbuilding of Los Angeles, and Galena Service has been a big factor in the progress of transportation methods.

# Galena-Signal Oil Co.

Franklin, Pa.



# WAIT!!

## Don't Specify your Heater Requirements until you Investigate the New Jewel Hot Blast Stoves

The Detroit Stove Works, one of the largest and oldest manufacturers of stoves in America, has produced a new forced ventilating street car heater, embodying some of the most interesting features ever offered in a heating plant to the electric railway trade.

All through the past winter these new Jewel hot blast stoves have been in service on seven large and important electric railways, going through a work-out before they were announced.

The unusual amount of heat which these stoves have produced, the marvelous saving in fuel consumption, and the reduction in the number of parts proves the Jewel Hot Blast Stove the most suitable hot air stove ever offered for railway use.

Jewel heaters have delivered more air at a higher temperature and with less fuel consumption than any other forced heating system. Moreover, they are able to burn anything—soft coal, hard coal, coke or any combination of these fuels. This is made possible by the Jewel hot blast feature, a means for supplying greater amount of air to the fire box than with any other stove and thereby giving a complete combustion of the gases. The Jewel stove has a scientifically designed combustion chamber.

Another feature—the motor and blower in the Jewel stove are placed in a separate compartment, in the base of the heater. The motor is thus kept cool and the high cost for maintenance of motor parts where they are subjected to the heat from the stoves, is thus eliminated.

The Jewel system takes fresh air from the roof of the car, conducts it down around the flue, around the fire box, through the fan, and into the car body, thus furnishing clean, superheated air. The fact that it moves in direct lines is partly responsible for the increased output furnished by the Jewel stove.

Jewel stoves are well and substantially made. They are pleasing in appearance; they have only one-third of the parts formerly used in this type of heater; the entire stove interior can be reached by removing 4 bolts on one side of the Jewel stove, making it far more accessible than any other heater on the market.

These Jewel heaters are the result of exhaustive study on the part of one of the most experienced staff of heating engineers in America. The mark of the Detroit Stove Works is shown throughout its design, and the enthusiasm with which it has been received by the railway men who are using it, is indicative of the success which the Detroit Stove Works has made of this newest Jewel heater.

*Complete Description, Prices, Etc., on Application*

## Holden & White Inc.

817 Fisher Bldg., CHICAGO

2213 Dime Bank Bldg., DETROIT





Coal Is Not the Only Thing Saved  
Through Increased Coasting

*Reduce Your Car  
Maintenance  
Through the use of*

# Rico Coasting Recorders

Of course, your *first* object in equipping your cars with the Rico Coasting Recorders would be to save POWER.

*But* other advantages accrue from INCREASED COASTING.

For example:

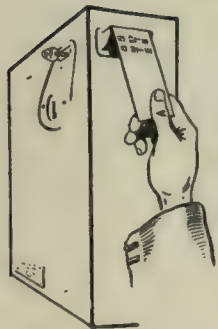
**Greater brake shoe mileage.**

**Fewer armature burn-outs.**

**Better control.**

**Greater safety.**

**Reduction of accidents.**



Many roads equipped with Rico Coasting Recorders have demonstrated conclusively that they practically pay their original cost the first year—frequently in the first few months.

## Time is the Essence of Railroading

RAILWAY IMPROVEMENT CO.



61 BROADWAY, NEW YORK





## Protecting Your Service

Electric storms have a way of appearing at the most unfavorable traffic hours. A car put out of commission then means congestion, delay and consequently irritated patrons.

Companies that formerly pulled down their trolleys now find that they can operate throughout the heaviest lightning storms through the use of G-E aluminum arresters on their cars.

Order early, before the time for lightning storms.

**General**  **Electric**  
General Office **Company** Schenectady, N.Y.



# Electric Railway Journal

Consolidation of STREET RAILWAY JOURNAL and ELECTRIC RAILWAY REVIEW

Volume 53

New York, Saturday, March 22, 1919

Number 12

## Electrification Demands a New Type of Engineer

**L**AST WEEK the American Institute of Electrical Engineers held an all-day meeting in Boston, and devoted the morning session to steam railroad electrification. In the paper by Calvert Townley and the discussion which followed its presentation, the subject was viewed from an angle different from that usual at electrical engineering meetings. The emphasis was laid upon financial considerations, particularly limitations, and upon the personal element. The technical difficulties of electrification were properly assumed to have been largely overcome, and difference of system to have become negligible. What was particularly interesting was the reference to the parts played in the matter by the steam and electrical engineers, each of whom was acknowledged to lack certain elements. The "steam man" would naturally be bound by certain engineering and operating prejudices, while his electrical brother would by temperament and inclination tend to overoptimism in his vision of an all-electric railroad system for the country. A new type of engineer is needed, therefore; shall we call him an "electrification engineer," or better, a "transportation engineer"? He must be able to perform the very difficult feat of approaching the electrification proposition from two directions at once. Even a few big men of this type can be very useful during the next decade.

## Economical Maintenance Has the Floor This Week

**I**F THIS ISSUE of the ELECTRIC RAILWAY JOURNAL does not help master mechanics, way engineers, power plant men and others in making a dent in maintenance costs it will have failed of its purpose. While the presidents and general managers are struggling with the questions of fares, franchises and publicity the men mentioned above must keep the cars going, and going well. It is a perfect marvel how they have succeeded in doing this under the conditions which have prevailed during the last three or four years. If it had not been for a combination of ability and loyalty on their part the problems of the executives would have been even more difficult to solve than they are. The editors of this paper have had the conviction, and there is reason for it, that under war-time stress new or improved maintenance methods would be developed that would be greatly in advance of those used heretofore. Evidence is accumulating to show that this is the case. Look over this issue of the paper with a view to picking out some of the things that show improvements in maintenance methods. There are many of them. They all help to lessen the burdens of the men higher up.

The writers of the articles in this issue have been asked and urged to hold primarily in mind the thought

of keeping down costs. Of course by this we mean long-run costs, not necessarily first costs. The writers are all men who speak from practical experience; there is no theorizing here. On behalf of the industry we express appreciation for the efforts of many busy men to make this the most helpful Maintenance Issue the paper has ever published.

## Spirit of Compromise Should Control Valuation Work

**T**HE electric railway industry is breaking down. We are sure, however, that neither the prominence of the speakers at the mid-year meeting of the American Electric Railway Association last week nor the vehemence of their utterances made the above-stated fact more apparent to the delegates than it was before they came to New York. The industry has known for a long time that it was facing a catastrophe. How to avoid this is the real question, and it is this phase of the discussion at the meeting to which the closest possible attention should be given.

A readjustment of the relations between electric railways and the public is inevitable in the majority of cases, and where this is necessary, according to Mr. Gadsden, only two ways are open—the acceptance of the service-at-cost principle or the submission to public ownership. For reasons which have appeared often in these columns, we believe that the service-at-cost principle gives the better promise of success from the point of view of the utility, municipality, commission and investor. Hence we welcome, as a most commendable sign of progress, the determination of the association through the committee on readjustment to analyze the service-at-cost idea in all its theoretical and practical aspects and directly aid companies and communities in the application of this idea.

But, as Mr. Gadsden, Mr. Kealy and others pointed out, the primary requisite of any service-at-cost plan or of public ownership, too, for that matter, is a valuation. This subject has been discussed by a multitude of men during the last few years, and the fundamental principles have been definitely determined. They are clearly stated, for example, by Mr. Taylor. Unfortunately this does not mean that such valuation figures can always be obtained, so that some companies may have to decide whether business expediency may not sometimes dictate the acceptance of a lower valuation than theoretical justice would require.

To Mr. Kealy's mind, the day for a new phase of valuation work—that of compromise—has indeed come, and we believe he is right. This does not mean that electric railways should hasten to sacrifice their property value. It means simply that many details in valuation work, regardless of the mutual acceptance of principles, are matters for bargaining and therefore



compromise. It means that a point should without great difficulty be reached where the immediate assurance of protected investment and prompt returns through agreement can well be deemed more beneficial to all concerned than the insecure investment and defaulted returns almost certain to accompany a continuance of the controversy.

The question is a grave one upon which, as Mr. Gadsden pointed out, the association must in the near future take a positive stand. Some interests may not be benefited under a valuation and a service-at-cost plan, but, as Mr. Taylor stated, corporations which through gross overcapitalization are unable to accept his principles constitute an abnormal class which the association cannot justly sustain. Without a doubt the great majority of electric railways would be helped by valuation compromises leading to service-at-cost franchises.

### A Promising Element In Electric Railway Power Distribution

THE automatic substation is not perfect, of course. No reasonable person would expect it to be so after less than four years of commercial development, especially with a world war going on during most of this period. However, on visits made to typical automatics during the past year the writer has yet to hear anyone say that the principle of automatic control is not sound and that such minor imperfections as still exist in the equipment are other than those naturally incidental to such a new and important improvement.

When the automatic plan was first promulgated it was a rather general belief that very little modification in standard apparatus would be needed to provide everything necessary for making substations automatic. It was soon found, however, that there were certain specific service requirements in such substations that made some modification necessary. For example, switches which had ample rupturing capacity for the very occasional opening which occurs in a manually-operated substation were found to need modification when operated many times a day. Relays which were all right in a uniform temperature were found to vary in time of operation when subjected to fluctuating temperature. Such things as these are, however, mere trifles when compared with the wonderful development of the equipment as a whole.

Unfortunately for the automatic substation, practically its whole life has been simultaneous with high prices, scarce labor, discouraging conditions of the industry generally, and war. In spite of all this a great deal has been accomplished, and the record has been placed before the industry in a series of articles in this paper, the latest being in the present issue. Other important articles are in preparation. A review of these at this time will prove very profitable to anyone vitally interested in improving power distribution conditions on his property. The subject also might be well discussed at the coming convention of the American Electric Railway Engineering Association. This association has held practically no meetings since the automatic substation became a factor in power distribution. Many members of the association have now had practical experience with its operation. A frank comparing of notes would therefore be beneficial, not only to those who have installed these substations but also to the larger number who hope soon to install them. We sug-

gest therefore that a liberal space on the program be assigned to this topic. There will be no difficulty in getting qualified engineers to handle it.

### Talk About What The Public Is Thinking and Feeling

THE replies to our recent questionnaire to public representatives, of which two sections have been printed, indicate, as we have said before, that the present ignorance and distrust on the part of the public can only be removed by publicity and proper service on the part of the railways. Furthermore, in speaking particularly of publicity, the great majority of the commissioners, mayors, leaders of chambers of commerce and others said that there was a need of complete data, frankly given, on the subjects of operating expenses, increases in costs, investment and rate of return.

This question of what facts to give the public is of fundamental importance. Not all that is published as publicity should really be called by that name. Many electric railway publicity campaigns which have been conducted have been distinguished by one or both of two features—a good-humored or satirical commentary upon the foibles of the traveling public, or an ingenious presentation of matters about which the railway wants the public to think. Such campaigns are all right in their way, but after all they are merely the adjuncts of publicity. They talk about the patrons, rather than to them about the company; or they tell what the railway thinks the patrons should know about utility problems in general rather than what the patrons want to know about their company's problems.

Now do not mistake our argument. The individual patron and the public as a whole have shortcomings and need to be educated, but campaigns should begin at the right end. The real publicity campaign—and consequently the only successful one—is that which concerns itself with matters about which the public is clamoring for information. There is no substitute for a frank, truthful answer to what the public wants to know. Other information is by nature, and should be by position, supplementary.

### Hope that Time Will Correct the Situation Probably Illusory

A FAVORITE argument used to deny the need of higher fares on electric railways is that the higher prices during the war were temporary only and now that the armistice has been declared and the soldiers are returning to peaceful occupations, prices will go back rapidly to the level of five years ago. For these reasons, it is claimed, the need for the higher fare is over or will be within a few months and it is not worth while now to go to the trouble of making a change. Some electric railway men may have had the same thought and have believed that if they could keep their properties out of the hands of a receiver until next summer or at latest in the fall, they would reach a time when their troubles would be over.

Those who think the coming of low prices is only the question of a few months can well read the comments quoted by the Public Service Railway from leading authorities on economic matters in the company's petition for a zone system of fares. The authorities mentioned include the Federal Reserve Board, Mr. Vanderlip, the National City Bank and the Mechanics & Metals



Bank of New York. These opinions, while naturally conservative as regards the future trend of prices, are far from supporting the idea that there is to be any early return of the prices of 1914-15. For the most part, these opinions were given early in the year. Since then, Prof. Irving Fisher of Yale has expressed himself even more strongly in support of the view that we are definitely on a new high-price level which presumably is as permanent as anything in the way of prices can be. In fact, Professor Fisher says "Business men should face the facts. To talk reverently of 1913-14 prices is to speak a dead language to-day."

He bases his opinion, which was presented at the conference of governors and mayors at Washington early this month, on the increase of the country's gold supply, the increase in deposit banking throughout the world, the continuation of government loan issues connected with reconstruction throughout the world and other pertinent factors. In reply to the statement sometimes made that prices will have to fall when we begin to feel European competition, Professor Fisher points out that since the war, prices have risen in Europe more than here, and in his opinion they are no more likely to fall there than here and for the same reasons.

We are quoting these facts so as to remove any false impression of the probable future trend in prices. But even those who believe that prices will come down have no valid reason for denying a higher fare to electric railways. If prices do fall and the railway profits become excessively large, the Public Service Commission has absolute right to reduce the fares. Hence the last vestige of any reason for keeping fares on a low level has disappeared.

### There's a Broad Field for the Proposed Welding Society

**W**ELDING operations cover a field in which all branches of engineering are interested. At present all the technical papers in this country and abroad are having a good deal to say about welding. One reason for the attention thus being focused on the industry has been the pressure which the welding committee of the Emergency Fleet Corporation has placed on manufacturers of welding equipment to develop their apparatus to supply the urgent needs that were required during the war. Another reason is the popular interest excited by certain welding repairs which were carried out on the disabled German ships in this country. This set all branches of industry to asking why welding had not been applied more extensively to the work in their particular fields.

Previous to the war the development of all types of welding was hindered by the fact that a great amount of work done by welding had proved unsatisfactory. This resulted from lack of proper attention to underlying principles. Industries which have a broad field for the application of welding thus came to consider that special skill is required to produce good welds. It was further assumed that good and bad welds look alike and that there was no efficient method for checking up a completed weld to assure perfection. Another cause for the distrust which has been felt toward welding operations has been the endeavor of some manufacturers of welding apparatus to build up business for their particular lines of welding equipment upon the basis of mistakes or failures of the apparatus of other manufacturers. When users have pointed out that welding has

proved unsatisfactory, rival manufacturers have sometimes stated that the poor results were due to the use of improper apparatus and that if their particular equipment had been used the fault would not have occurred. Here is where the new association of welding engineers will come in, for welding investigations conducted by an interested and dependable society will prove of great benefit both to those who use welding in their production and to the manufacturer of welding apparatus and supplies.

### Road Supervisors Draw Attention to Weaknesses in the Service

**C**OMPLAINTS about the quality of electric railway service received by a company from its patrons or published in the newspapers may have a real foundation or they may not. In some cases they undoubtedly come from a person who expects what is equivalent to taxicab service, or better than taxicab service, for a street car fare. All such complaints, when addressed to the company, should be answered, and if definite should be investigated. It is not, however, to the method of handling these complaints as to the lessons from a transportation standpoint which they may teach to which we wish here to draw attention. They often point out real weaknesses in the service which otherwise might escape observation.

In this connection, a recent analysis of the operating statistics of various electric railway companies reveals some strange comparisons, and shows perhaps a way for getting improved service in some cases without the expenditure of additional money. The item to which we have particular reference is that entitled "Cost of Superintendence." We will find, for instance, two properties of practically the same size and with similar local conditions, and one has a much larger expenditure for "superintendence" than the other. A first-hand study of service on the two systems reveals the astonishing fact that the company which paid out the most for "superintendence" makes the poorer showing in handling passengers. Investigation reveals the probable reason in the fact that the company which paid most for superintendence has an unusual number of starters or terminal men but is short of supervisors or inspectors traveling over the lines.

An experienced transportation man, in discussing this point, expressed his belief that the best results are not to be obtained in employing a great number of men to act as starters at the ends of routes. He had found that the platform men are likely to be spoiled by such practice, being trained to depend on others for the observance of scheduled leaving time and in the absence of such supervision the service had a tendency to become irregular. Said this official: "There is such a thing as too much supervision, or rather improper distribution of supervision. These starters as a rule have no disciplinary power and merely act as machines in telling the crews when to start. Trainmen are thus likely to lose initiative, and when starters are not on duty all day long or at all terminals the result is inefficient service. The same money paid for a few more intelligent supervisors, responsible for the regulation of service over a given territory, will always get more beneficial results."

We are inclined to put much faith in this point of criticism, and we offer it as a suggestion to transportation officials who really desire to please their patrons by distributing their facilities to the best advantage.



# Extending the Life of Wood Poles

By CHARLES R. HARTE

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New Haven, Conn.

**Many Methods Are in Use for Prolonging the Life of the Various Woods—The Author Describes These, Discusses Their Relative Advantages and Points Out How Different Preservatives Keep Out and Destroy the Destructive Germs**

**T**HE seasoning of wood is a much more complicated process than the mere drying out of the contained water; chemical

changes occur in the contents and in the walls of the cells which have a marked effect upon the characteristics of the wood; but the amount of water content in the wood is the simplest and the most universal test of seasoning. This water occurs in three forms: First, what is commonly known as the sap, which fills to a greater or less extent the cavities in the wood fibers, particularly of the sapwood; second, water saturating the walls of the cells themselves; and third, water in the contents of the living cells, which constitutes more than 90 per cent. It is estimated that fresh sapwood of white pine is 50 per cent water, so that in 200 lb. of such sapwood 100 lb. is water and of this latter 60 lb. is sap, 35 lb. is in the cell walls, and 5 lb. is in the cell contents. In the heartwood, however, mineral salts from the sap, and gums, resins and the like produced by the action of the living cells, to a considerable extent take the place of the water. In consequence, the heartwood is not nearly so favorable to the growth of decay as is the sapwood; on the other hand, these deposits seal in such water as remains, and make the thorough seasoning of the heartwood a long-time procedure.

The rates at which the water dries out of several kinds of poles, and for different times of cutting are clearly shown in the accompanying curves, which are taken from Bulletin 84 of the United States Forest Service. These curves cover the usual practice in air seasoning, but in dry air the process goes on for a much longer period than shown, although the loss of water after the first few months is, speaking comparatively, very slow.

If, instead of piling in the air, the poles are first soaked for a few weeks, it is found that seasoning after their removal from the water proceeds at a much faster rate than in the case of the entirely air-dried ones; this is due to the fact that much of the gum and mineral matter is washed out, giving the contained water a more porous material through which to be evaporated.

## REDUCTION IN WEIGHT SHOULD BE CONSIDERED

While the chief purpose of seasoning is to cut down as far as possible the food supply of the fungi causing decay, and in case of preservative treatment, to put the wood in condition to absorb the maximum amount of the chemical used, the reduction in weight,

and consequent saving in freight charges, is no small matter, ranging, as it does, from about 16 per cent in the case of chestnut to nearly 50 per cent for Western yellow pine. In the experiments described in Forest Service Bulletin 84 the results were as follows:

Species	Length of Treatment Months	Size of Pole Top Length	Weight of Pole Pounds		Loss of Weight	
			Green	Seasoned	Pounds	Per Cent
Chestnut.....	4 to 6	7 in. 30 ft.	1120	940	180	16
Northern white cedar.....	6 to 12	7 in. 30 ft.	581	440	141	24
Western red cedar.....	3 to 5	8 in. 40 ft.	902	683	219	24
Southern white cedar.....	3 to 8	7 in. 30 ft.	768	540	228	30
Western yellow pine.....	3 to 9	8 in. 40 ft.	1697	862	835	49

These figures are for commercial air seasoning; a longer treatment under the same conditions of reasonably free circulation of air about the poles will result in still further loss of water, but at a rate which as a rule does not warrant it; kiln drying removes more water in very short time, and if immediately followed by treatment is often desirable, but great care must be taken that the heat is not high enough to affect the strength of the wood, and that the dried pole is at once treated, as otherwise it will absorb moisture from the atmosphere and will go back to the condition of an air-dried pole.

It has been mentioned that for air seasoning the poles should be so piled that the air has a free circulation about them; it is at least as important that they be held clear of the earth and that the supporting skids be of sound timber; and it is hardly less important that all undergrowth be cleared away.

As a result of the removal of the sap itself there is little mechanical disturbance of the wood fibers, but as soon as the water in the cell walls begins to diminish the walls contract and set up stresses which are the chief cause of checking or cracking. The contraction is very slight in the direction of the grain, but across the grain it is considerable. It is about twice as great tangent to the growth rings as it is in the direction of their diameters and as a result the heavy checks are radial, and "ring checks" are apt to be very small or lacking unless the seasoning has been rushed. With most woods the larger part of the sap dries out before the cell wall water is affected, and the deposit in the wood of the solids held dissolved in the sap tends to choke up and to check the drying out of the cell wall water. With normal conditions little trouble is experi-



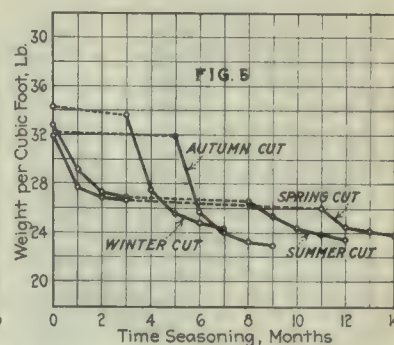
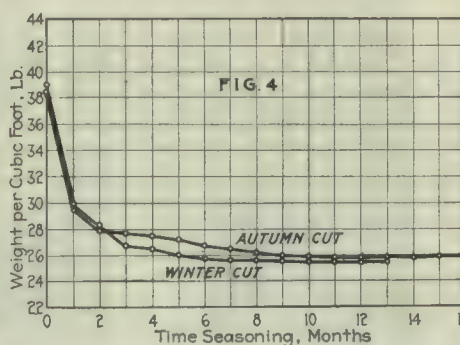
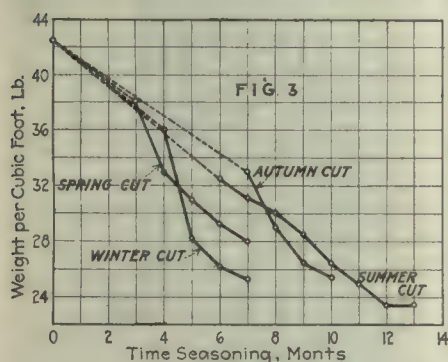
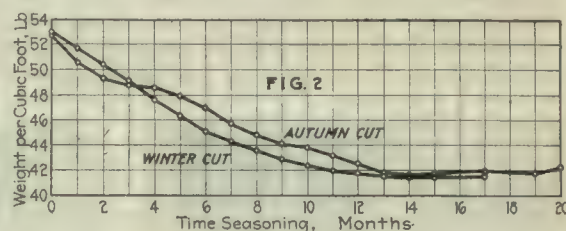
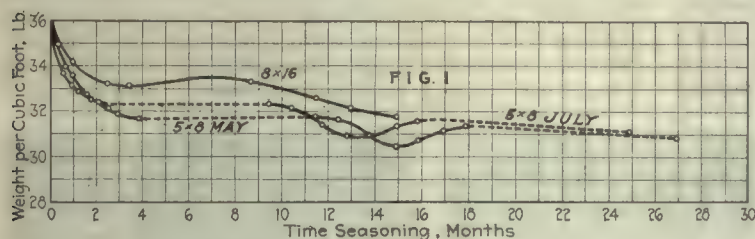
enced, the contraction being so slow that the wood adjusts itself to the stresses without actual splitting, and even with some speeding up the checks are chiefly at the butt, and being buried below the range of the decays, give little trouble. Such checked poles, however, should be carefully inspected to be sure that the checking is not serious at or close to the ground line.

#### CIRCUMFERENCE OF POLES REMAINS PRACTICALLY UNCHANGED WITH SEASONING

It is believed by many, particularly if they have poles to sell, that seasoning shrinkage materially reduces the circumference, so that poles well within specification requirements when cut, after seasoning often fail to pass, and the writer, and probably every other overhead man, has had many a doleful tale of such unfair shrinkage. As a matter of fact, however, very extensive measurements made by the Forest Service show

seasoned pole it seems materially to speed up fermentation of the sealed-in sap and the growth of forms of decay which require little oxygen, and which destroy the strength of the timber with practically no outside indication of the fact until under a load a little heavier than usual the pole fails. The artistic and restful effect of painted wood poles has led many city fathers to demand them; their consistently bad behavior leads wise overhead men to be equally insistent against their use.

Various tars have been used substantially as paints, with but little better success; the coat is more elastic, and therefore less liable to mechanical injury, and it does have a little greater antiseptic effect, but it does not penetrate and decay can and does occur under it almost as badly as in the case of oil paint. The practice of casing with concrete belongs in this general class. Oddly enough, although it might well be considered that



SEASONING OF POLES AND TIMBER, SEVERAL KINDS OF WOOD

Fig. 1—Douglas fir timbers, Eugene, Ore.

Fig. 2—Chestnut poles, Thorndale, Pa.

Fig. 3—Western red cedar poles, Wilmington, Cal.

Fig. 4—Southern white cedar poles, Wilmington, N. C.

Fig. 5—Northern white cedar poles, Escanaba, Mich.

that the external circumference is practically unchanged even when there is heavy checking, the shrinkage from green to air-dry condition averaging from three-tenths to one-half of 1 per cent of the circumference at the ground line, and from three-fifths of 1 per cent to nearly 1 per cent at the top, equivalent on the usual sizes of poles to from  $\frac{1}{8}$  to  $\frac{1}{4}$  in. in both cases, or a little less than one-third of this for the reduction in diameter.

A large proportion of the poles of to-day are innocent of any treatment other than seasoning; indeed, an appreciable number do not even get properly seasoned, but there is a steadily increasing percentage of the poles used which have had more or less extensive treatment with preservative of one kind or another. Some, as the paints, serve chiefly to keep out the germs mechanically, and if improperly applied afford them the best of conditions for growth. Others are more aggressive, and destroy any germs attempting to get a foothold.

The paints are used practically never except as local ordinances compel. A good paint, carefully applied to a smooth, dry pole, gives a coat which while unbroken is excellent armor against decay. Unfortunately—for it is comparatively easily applied—a paint coat is not only easily broken through, but if spread over a partially

in principle this is little different from painting and that internal decay would be promoted with the concrete treatment, the reverse is true, due apparently to absorption of salts from the green concrete, and the subsequent protection against their dissolving out given by the hardened concrete. The cost of the treatment bars it as a rule unless the concrete also serves as a foundation help; when used, the top of the concrete should slope sharply down from the pole, and care should be taken that there is no opening between the wood and the concrete in which rain water could pocket.

Still another treatment of the type surgeons would describe as aseptic, or keeping the "bugs" out, rather than the antiseptics, which are active poisons to the little scoundrels, is that of charring, but while this is comparatively simple and cheap it is unfortunately very uncertain in its action, and is very little used. To this uncertainty of result there is added, as further disadvantages, the facts that the charring is very easily carried to a point where the strength of the pole is affected, and the pole after treatment is much more readily lit up in case of a brush or grass fire.

Of the antiseptics there are two groups, the mineral salts and the oils. Of the first the chief are chloride



of zinc, bichloride of mercury, and sulphate of copper, the last two better known as "corrosive sublimate" and "blue vitriol" respectively. All three would be excellent if it was not for one common and very serious fault. They dissolve readily in water, and unless they are given some additional treatment they soon leach out except in very dry climates. The oils used are chiefly the creosotes and similar compounds.

When any organic matter is distilled, or heated so that it cannot burn, there are given off vapors some of which are permanent gases which do not change, while others condense as liquids and may be broken up into other combinations by suitable redistilling. In fact, the proportions of these different compounds in the first distillation can be greatly altered by varying the temperature and the speed of its increase. Eventually there is left in the still a solid mass of carbon and other solid matter, but just before this there comes over an unsavory syrup which has been given the general name of tar. This is really a most wonderful mixture and furnishes in addition to the other innumerable dyes, medicines, etc., the creosotes and the similar preserva-

it is given off between the temperatures of about 450 deg. and 520 deg. Fahr., and contains carbolic oils or tar acids, naphthalene, creosote oil and anthracene oil, the relative proportions varying considerably, depending on the coal, how the tar was produced, and whether or no a market demand for any of the constituents makes it desirable to remove them. Water gas tar creosote, as stated, lacks the more volatile tar acids, while wood tar creosote although also an excellent antiseptic and similarly obtained from wood tar, is chemically very different and the oil similarly obtained from petroleum tar, which has been used to some extent in the West, apparently acts mechanically, but by filling the wood structure rather than by coating it, as in the case of the paints.

The preservative treatments may be grouped into two general classes, either of which is applied under one of several systems by one of several methods. In each of the classes the wood is first as nearly saturated with the preservative as may seem practicable; in the "full cell" class of treatment it is left in this condition; in the "empty cell" class a considerable portion of the preserv-



THREE STEPS IN REINFORCING A WOOD POLE WITH CONCRETE—REMOVING DEAD WOOD—IRONS ATTACHED—REINFORCING LATTICE WORK IN PLACE

tives. Until comparatively recently the bulk of the creosote used resulted from the distillation of bituminous coal, either for illuminating gas or for coke. In the last few years, however, much creosote has been produced from the tar obtained in the manufacture of water gas. It will be remembered that water gas is made first by passing steam through a bed of glowing coal or coke, producing carbon monoxide, the "furnace gas" which every now and then wipes out a careless family, and then passing this gas, which gives almost no light when burned, and petroleum, through a very hot chamber or series of chambers where the oil is "cracked" into various compounds, some of which enrich the water gas while others condense out as it cools, forming a tar. The creosote obtained from this tar lacks the carbolic oils or tar acids of coal tar creosote, but while it was long believed that these tar acids were the important element of creosote, investigations by the Forest Service indicate they are far less important than was supposed.

Commercial creosote, it might well be pointed out, is the product obtained by the distillation of tar, after the first volatile oils have come over, and before "pitch" has been reached in the still. In the case of coal tar

ative is withdrawn, on the theory that with good penetration it is only necessary to coat the cavities, and that any additional preservative is practically wasted. A high pressure system is the most effective for actual preservation, but the plant required is expensive; too expensive in fact for any but large users of wood in sections where either climatic conditions or high cost of long-lived timber compel treatment of everything. Under all other conditions it will usually be found that the somewhat less effective other systems are enough cheaper to be really more economical.

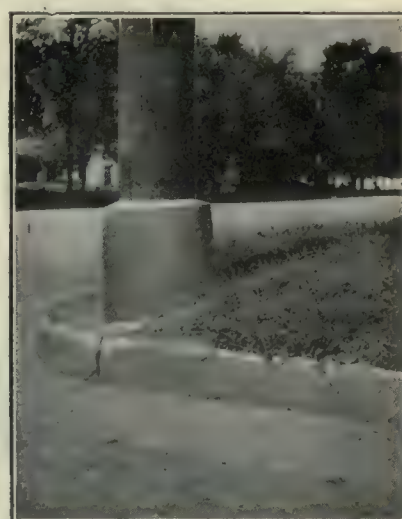
High pressure full cell systems require a treating tank long enough to take the longest piece to be treated and of sufficient diameter to insure the required output. The charge is usually piled on one or more little cars which remain in the tank during the treatment and serve to transport the treated material to the storage yard. There is also required a boiler to furnish steam, pumps for handling the preservative and the condensation, tanks for storing the fresh and the used preservative and in a plant of any size, apparatus for purifying the used preservative, and for reclaiming the preservative from the condensation, in addition to the track system and loading and unloading derricks in the yard.



Substantially the process consists of steaming the timber to be treated for several hours at a pressure of 20 lb. per square inch or even higher. The steam is then condensed and the resulting vacuum increased by the pump which removes the condensation, after which the tank is filled with preservative and enough pressure is put on to secure the desired absorption. The remaining preservative is now run off into the storage tanks, and after draining for a short time the treated wood is withdrawn and the tank is ready for a new charge. Of the methods under this system, the Bethell employs straight creosote oil; the Burnett employs a 2 or 3 per cent solution of zinc chloride; the Wellhouse "Burnettizes" and then gives an injection of glue and tannin, which is insoluble in water and seals the zinc chloride against the leaching effect of water; while the Ruepping, Card and Allardyce methods employ zinc chloride and creosote, the first two mixing them, the Card keeping them thoroughly mixed by mechanical means during the treatment, while the Allardyce first treats with zinc chloride and then follows with the creosote.

In the high pressure empty cell systems the material

proved effective in the bichloride of mercury treatment (Kyanizing) of cut timber, it is little used otherwise. The more common procedure is the "hot and cold" treatment, in which the material is first soaked in hot preservative until it reaches the same temperature (about 200 deg. Fahr.) by which time the consequent expansion of the inclosed air has forced out of the material much of that air and quite a little of the sap still remaining in the case of air seasoning. The charge is then given a bath of cold preservative, and the resulting contraction of the air still in the wood creates a partial vacuum, into which the atmospheric pressure forces the preservative. In the empty cell process the cooling material is taken out of the bath when at a temperature of about 200 deg. Fahr. and allowed to complete the temperature reduction in the air, securing an absorption of the preservative which is on the outside when the material first comes from the bath, so that the finish finds a dry surface. This scheme necessitates one or two treating tanks depending upon whether the bath is changed or the material is shifted. In a large plant the latter plan is usually best; in a smaller plant the



REINFORCING WOOD POLES WITH CONCRETE—AT LEFT, TAMPING THE CONCRETE; AT RIGHT, A FINISHED JOB; IN CENTER, THE REINFORCING OUTFIT ON THE WAY

must be seasoned before treatment. The plant omits the boiler, at least as far as steaming is concerned, but an air pump is required in the Ruepping method, which first puts the material in the tank under an air pressure of about 75 lb. per square inch, then fills the tank with preservative without releasing the pressure; next raises the pressure to about 225 lb., and finally suddenly draws off the preservative. The expansion of the air trapped in the cells blows out all but a film of preservative. In the Lowry method the preservative is run into the tank at the start, pressure is applied to it, and then it is not only withdrawn, but a vacuum is quickly created, and, as in the Ruepping method the trapped air blows out all but a film.

The low-pressure systems employ a full-size treating tank, and in general they differ from the high-pressure systems chiefly in that the pressures used are quite low, thus permitting a marked saving in the cost of the treating tank, and further savings in the cost of the auxiliary apparatus.

The no-pressure or open-tank methods are of two types. In the simplest the well-seasoned material is simply soaked in cold preservative, and while this has

former is more economical, while for very small lots it may pay to use but one bath and leave the charge in it until both bath and contents have cooled. For long material, as poles, which require complete treatment the tank will naturally be horizontal, but except for those regions or species of wood in which decay occurs in the upper portion as well as at the ground line of poles, a butt treatment to a point about 18 in. above the ground is usually sufficient and for this a vertical tank is best. In addition to the open tank or tanks there are required means for heating the first charge, pumps for handling the preservative, storage tank or tanks and a derrick for handling the material, and if much work is to be done, storage space and an industrial track system are necessary.

A method which is increasing in use, and which has the marked advantage that it is applicable to poles already set, although it is the least effective in terms of actual protection, is the brush treatment in which hot preservative is brushed or mopped on the dry pole or other subject. This method requires only the means of heating the preservative, the necessary brushes or mops and some form of support for the poles during



treatment and until the coat is absorbed. At best the absorption is less than with any of the other methods, and the penetration is by the lighter tar acids rather than by the heavier and more lasting constituents in the case of creosote treatment. Better results are usually secured when the preservative used is one of the proprietary types, which have compositions designed to give good penetration and which for any one hand vary very little, rather than the commercial creosotes. In general the brush treatment gives a penetration about one-half as great as that obtained by the open-tank method. For the best results the preservative should be at a temperature of about 200 deg. Fahr., the pole should be well seasoned and dry, and two coats should be given; the second only after the first has been absorbed.

The metallic salts used in preservative treatments are definite chemical compounds and any adulterant is readily "spotted" by the chemist if not by the layman, but "creosotes" may vary within wide limits and characteristics, and yet be properly so called. The National Electric Light Association recommends the requirements given below for coal gas tar creosote, water gas tar creosote, and mixed tar creosote respectively as producing the best results. The Western Union Company uses substantially the same specification for coal gas tar creosote, and for comparison the latter company's specification for carbolineum is also given. The treatment used for any particular case will depend largely on local conditions. For yellow pine or other woods which decay readily in the upper portion, and for almost all woods used in the South a heavy treatment is necessary and this practically requires the closed tank method. In general, however, this method is employed for piling and lumber or other forms of wood which must have deep penetration of the preservative. Extensive new work in sections where conditions are not adverse will generally employ open-tank treatment, largely with creosote, either in commercial or in



POLE REINFORCED  
WITH STUB

proprietary forms, although the zinc chloride treatment is excellent for dry climates or when properly sealed in; while for a great deal of work, particularly in projects of small size, or for the smaller companies, the brush treatment will be used. Incidentally it is claimed that a mop is much better than a brush for the actual application.

When it comes to the question of increasing the life of poles already installed, however, the choice of treatments is more limited. If decay has already begun, there will be an affected belt at the ground line, usually about a foot in width, the rot depth depending upon the length of time it has been proceeding. If not checked, it works toward the center of the pole at a much slower rate upward, and at a still slower rate downward (unless the ground line is lowered) until eventually the pole fails. Meantime the soil about the pole has become infected; spores and the hyphae or the plant proper of the fungi are scattered in it, and conditions are favorable for quicker destruction of a new pole unless something is done either to remove or to kill the causes. In addition to the decay, insects which attack decayed wood are usually present, and help the attack on the old pole and its substitute.

Whether the damage is to be repaired or the pole is to be replaced by a new one, the infection danger must be reduced, and by far the safest plan is to remove the earth for a depth of 2 or 3 ft., and an equal distance all around the pole. If then the pole is to be restored the decayed wood must be cut out, for which purpose a broad chisel on a long handle, or a scraper, such as butchers use for their chopping blocks, similarly mounted will be found very convenient. Whatever the tool, the pole must be freed from all dead wood.

If this leaves sufficient solid stock the pole can be given only a preservative treatment. Quite a little work has been done to develop a small cylinder which, being in two parts, would be clamped over the critical section and would then allow a local pressure treatment, but while some promising results have been had, so far as the writer knows there is as yet no device which is really successful, the problem of sealing the ends being the chief difficulty. This leaves the brush treatment practically the only method. With a dry pole, hot preservative and two good coats produce very good results. Unfortunately it is a difficult matter to secure such conditions, and many companies feel that the cost of good work, or the short-lived effect of cheaper work, does not warrant the trouble.

Out of this condition there have developed two ways of avoiding a renewal, while some of the communication

#### N. E. L. A. AND W. U. SPECIFICATIONS FOR PRESERVATIVES

Preservative Specification	Coal Gas Tar Creosote N. E. L. A.	Water Gas Tar Creosote N. E. L. A.	Mixed Tar Creosote N. E. L. A.	Carbolineum W. U.
Must not contain.....	Raw or partly distilled tar of any kind; other creosote nor petroleum oil.....	Raw or partly distilled tar of any kind; other creosote nor petroleum oil.....	Petroleum oil nor its distillates, nor water gas nor oil tars or their distillates which contain more than 10 per cent of paraffine oil.	Any other tar, oil or residue from petroleum or any other source
Specific gravity at 38 deg. cent.....	Not less than 1.03. Not more than 1.08	Not less than 1.03. Not more than 1.08	Not less than 1.04. Not more than 1.10.....	Not less than 1.09 Not more than 1.135
Residue soluble in hot benzol, not more than.....	1 per cent.....	1 per cent.....	3 per cent.....	0.25 per cent
Water, not more than.....	2 per cent..... Shall mix with absolute alcohol, volume for volume.....	2 per cent.....	3 per cent.....	Flashpoint not below 140 deg. Burning point not below 170 deg.; ash on ignition not more than 1 per cent
Residue after sulphonation not more than.....	1 per cent.....	5 per cent.....	5 per cent.....	Fraction between 300 and 360 deg., 0.25 per cent
Tar acids, not more than or between.....	8 per cent.....	.....	Not less than 2 per cent, nor Not more than 8 per cent.	Below 300 deg. (not more than 2 per cent)
Distillate up to 205 deg. Cent; not more than.....	5 per cent.....	2 per cent.....	3 per cent.....	2 1/2 per cent
Distillate up to 235 deg. Cent; not more than.....	35 per cent.....	10 per cent.....	25 per cent.....	At 300 deg., 20 per cent
Distillate up to 315 deg. Cent; not more than.....	80 per cent.....	60 per cent.....	80 per cent.....	Above 360 deg., 35 per cent
Coke residue not more than.....	2 per cent.....	2 per cent.....	Above 360 deg., 35 per cent.	.....
Distillate between 205 and 235 deg. when cooled to 15 deg. Cent.....	Shall deposit naphthalene	.....	.....	.....



lines "duck" the issue by resetting the old pole until the lowest crossarm has reached the lowest possible limit. Obviously, however, such treatment can rarely be followed except on private way location.

The simplest proposition is to strengthen the affected pole by setting against it a stub which goes as deep as the pole and extends 5 or 6 ft. above the surface. The two are then tied together top and bottom by lashings, of wire and, if the pole has heavy service, by bolts through both. The old pole should be scraped, the adjacent earth replaced with fresh, and both pole and stub should have preservative treatment. This was for a long time the standard practice of the telegraph and telephone companies, but it, like resetting, is obviously restricted in most cases to private way location.

The Orr plan of reinforcement is a development to permit strengthening poles in highways. In this process the decay is cleared out as for the other treatments; the "necking" is then spanned by rods parallel to the pole, with their sharpened ends, which are at right angles to the main part of the rod, driven into the pole above and below the space decayed out. Outside of these is placed a belt of expanded or similar mesh steel

reinforcement. Outside of this a steel split form can be easily placed, and finally the entire space is filled with concrete which is carefully worked to insure that all spaces are filled. The top is then sloped outward, and when the form is removed the pole shows a concrete base 3 or 4 in. thick all around which extends about a foot above the surface. If properly done, the appearance is good; unless the decay had progressed too far the pole is as strong as it was originally, and the concrete acts as a preventive of further decay. Care should be taken that the rods are entirely buried in the concrete, and that the top has enough outward slope to shed water. The pole should be scraped to live wood, and the concrete must be well worked into the spaces, but none of these requirements is hard to meet and the method is being used to a considerable extent, particularly where there are enough poles to be treated to warrant equipping one or more teams for the work. On trolley lines the plan of employing a work car has been tried, but unless traffic is infrequent the car will spend most of its time on sidings, with serious results to the temper of the dispatcher, and a greatly augmented cost of the work.

## Maintenance Practice of the San Francisco Municipal Railway

Results of Five Years of Operation of this City Railway System, with  
Special Reference to the Relation of Construction to Upkeep

BY N. A. ECKART

Railway Engineer Bureau of Engineering, San Francisco, Cal.

**A** STUDY of the engineering design and the construction methods and practices of any railroad property will often reveal reasons for high or low maintenance costs. Unfortunately defects or faults in original design often may not be apparent for several years after operation has commenced, when some weakness develops in the track or equipment resulting in excessive maintenance charges. Sometimes these weaknesses may be remedied in the repair but as often as not the effects will continue to be reflected in the operating expenses until the time of reconstruction. The value of sound engineering design and practice in the original construction cannot be too strongly emphasized in view of the bearing that it has on the cost of maintenance. In each railroad system there are employed certain features of design and construction and methods and practices in construction and repair, which while confessedly not original are perhaps not in general use on other properties. These features have been adopted with the idea of avoiding troubles which have been observed to have developed in other properties where different practices have been the rule. Some details of the practice of the Municipal Railway of San Francisco which have aided in keeping down maintenance costs may be worthy of mention, although no claim for originality with respect to any of them is made.

On this system the standard construction specifications require that the subgrade shall be thoroughly flushed with a fire hose and rolled with a roller weigh-

ing not less than 10 tons. Where the subgrade is of clay it is not flushed, and likewise if of sand it is not rolled, although after 6 in. of ballast has been placed in the trench the sub-ballast is rolled with a 10-ton roller.

This practice has proved to have particular value in its effect in reducing the cost of maintaining the pavement adjacent to the tracks and likewise in adding to the permanency of the track surface. Where this practice has been followed the pumping of header blocks, which is a common occurrence on many roads, has been eliminated.

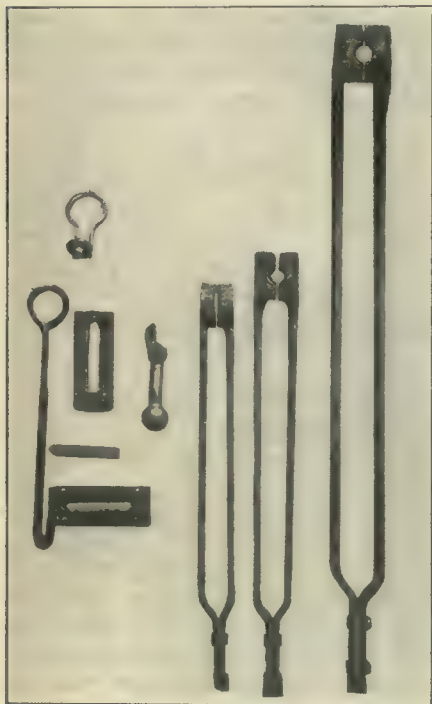
### SPECIAL WORK STANDARDS WERE DEVELOPED

In 1913, when the city started to work on the lines which were to serve the Panama-Pacific Exposition and later, to form the main part of our system, a very complete set of special-work standards were worked out comprising thirty-five pieces. These in combination permit of making up all layouts for right-angle street intersections, from a grand union to a simple branch-off and right- and left-hand crossovers. Standard specifications for the manufacture of this special work, which is all of solid manganese, were prepared. These established the limits of variation in dimensions of each of these parts, so that each part is interchangeable for a similar part in any layout. This interchangeability of parts proved of great value in the original construction, where time was of the utmost consideration, and it reduces the number of parts which must be carried in



stock for replacements and extensions to the system.

A rather interesting design of special-work layout was one installed at the intersection of Columbus Avenue and Taylor Street, and Columbus Avenue and Mason Street, where the Municipal Railway standard construction intersects a cable-operated line of the United Railroads in a curve, in both cases forming a rather acute angle and a point of intensive wear in an extremely expensive layout. To increase the durability the solid manganese crossing parts were made with insert plates, likewise of manganese steel, so as to permit of renewal in case of excessive wear or breakage at the crossing points. This layout has worn very well and although no renewals have been made up to date there is no question but that when the renewal is necessary it will more than double the life of this complicated and expensive piece of special work. The bonding practice



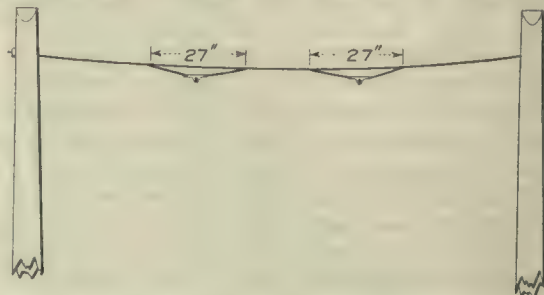
DROP FORGING DIES AND SAMPLES OF WORK DONE WITH THEM

adopted as standard on this system is the use of the electrically welded bond; of the concealed type in the girder rail construction and of the exposed type in the open T-rail construction. These bonds, which have been in service for five years, have not as yet had time to develop any weaknesses, and they show under test the same conductivity as when first installed. Concrete poles were adopted as standard practice at a slightly higher first cost than the steel poles with a particular view to reducing the maintenance charges in connection with the painting of steel poles. In San Francisco the salt air and fog corrode iron and steel very rapidly, particularly in the outlying and beach districts. The use of concrete poles has been found to be satisfactory and there have been no reasons developed which would warrant a change back to the steel pole. The concrete pole has permitted construction of extensions in short periods of time when deliveries of steel poles would have made their use prohibitive, and it is unnecessary to carry in stock any amount of concrete poles as they can be readily cast when required.

#### STANDARDIZATION OF EQUIPMENT SIMPLIFIES OPERATION

Wherever it has been possible the type of rolling-stock equipment in use has been standardized, with the result that the electric equipment of all passenger cars, with the exception of twenty-eight small cars which were purchased with the Union Street line of the Pre-

sidio & Ferries Company, are identical. This feature of standardization in equipment has a double value; first, in that all operators have only to familiarize themselves with the operation of one type, which avoids a great deal of unnecessary abuse; second, in that when repairs have to be made the repairmen have only the one type with which to become familiar, and of course standardization reduces the number of spare parts



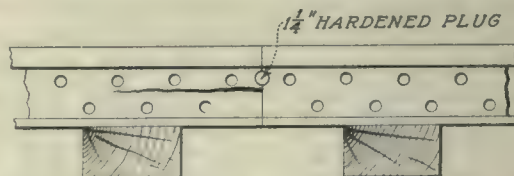
FLEXIBLE SUPPORT FOR TROLLEY WIRE AT "HARD SPOTS"

which must be carried. It is true, of course, that these conditions cannot always be realized, and that conditions on this system are more or less ideal in comparison with conditions which have developed during a long period of time rather than practically within two or three years as in our case.

#### PRACTICAL KINKS WHICH AID IN MAINTENANCE

Some repair methods or kinks which have been worked out by the master mechanic of this property and which have proved of value are outlined in the following paragraphs.

One of our cars was damaged in a collision with a large auto truck which tore holes in the side plates for a distance of 3 ft. and over a width of 18 in. Repairs on these were made by cutting out the entire damaged section with an oxy-acetylene cutting torch. Into this space a new plate of the same thickness was fitted and welded along the edges and the joint was ground smooth with the aid of a portable grinder. After the car was painted and varnished the patch was not discernible. To have inserted a new plate would have re-



SCHEME FOR REPAIRING A RAIL JOINT INJURED BY SPLITTING OF WEB

quired the removal and replacing of approximately one hundred  $\frac{3}{8}$ -in. rivets, the removal of the butt straps and about 60 sq.ft. of painting.

During the war when bronze castings were up to 55 cents and 60 cents a pound and deliveries were extremely uncertain, the following method of reclaiming worn axle liners was adopted: These bronze liners were bored out  $\frac{1}{4}$  in. and brought to standard dimensions with a medium babbitt. These reclaimed bearings are babbitted to exact size and require no further finishing. The average mileage obtained with the babbitted liner is approximately 40,000 and they can be rebabbitted many times before the bronze shell breaks.



It has also been found economical to substitute for certain small castings forgings which could be made in one heat. This forging work is done with a 300-lb. Bowdry power hammer by the use of several dies made up in the shop.

Two of the articles thus forged are shown in an accompanying illustration, one in the upper, left-hand corner. The procedure is this: A gate lock is first roughed out in the tong die shown just to the right. The piece thus "roughed" is inserted in the die of which the parts are shown just under the gate lock where the center portion is punched out. The slot thus formed is rounded out to the completed shape and the end is turned on the anvil. The illustration also shows a bell tapper which is forged out by the use of the longer two tong dies shown on the extreme right. In addition to the parts shown this method has been found useful in turning out a special bolt used for carrying the exit gate wheels, leaving the cutting of the thread as the only machine work to be done. We also make a peg for the motorman's stool, which is inserted in a 1-in.

web at the joint, the break has been repaired without cutting back and installing a short length of rail. The rail is drawn up under pressure by means of a heavy clamp applied at the head and base so that the crack is tightly closed. Then a 1½-in. hole is drilled and reamed in the web or the split so that one-half of the hole is in the adjoining sound rail. Into this reamed hole a 1½-in hardened steel plug is driven and the joint is replaced. While this method of repair might not at first glance appear mechanically sound, nevertheless it has stood up well under service and no weakness has developed. The economy over replacing the broken rail is very apparent, especially under existing prices.

### Suggestions for Safety Councils

At the Seventh Annual Safety Congress, F. M. Rosse-land, president Chicago Safety Council, made suggestions regarding the work of local councils. He said that the territory of the local council should be carefully divided into districts with a chairman and committee for each. The work in all districts should be the



OVERHEAD CONSTRUCTION, SAN FRANCISCO MUNICIPAL RAILWAY, SHOWING CONCRETE POLE CONSTRUCTION

pipe and coupled thereto with a standard 1-in. coupling. The threading of the peg is, likewise, the only machine-tool work on this piece.

Where "hard spots" have been found in the trolley wire, caused by the blow of the trolley wheel at the point of support the trouble has been materially decreased by making the suspension from a subspan, which subspan has a great deal less initial tension and mass than the main suspension span. The construction is illustrated in the accompanying sketch.

Switch-group units which have been removed on account of wear have the poles filled in by oxy-acetylene welding. They are then fitted with case-hardened pins and bushings. This method has resulted in prolonging the life of these parts to three times that of the plain untreated pins.

In several instances where a rail has split along the

same, except as local conditions may indicate a definite change, and should be divided in three parts: (1) industrial safety; (2) public safety; (3) home safety. Industrial safety will receive first consideration, of course, and efforts should be directed in five different channels: (1) Safety rallies for workers; (2) instruction classes for safety supervisors; (3) inspirational meetings for foremen and superintendents; (4) monthly safety dinners for executives; (5) the investigation of unusual industrial accidents. The safety rallies should be held at least once every four or five weeks, should be opened at schedule time and, if held in the evening, should close at 9.30 or not later than 9.45. They may be held indoors or out of doors; may consist entirely of moving pictures or include moving pictures as part of a program. These meetings are principally inspirational and are of definite value to the plant safety supervisors.



# Some Results of Rail Conservation

**Extended Trials Have Shown That by Careful Rehabilitation Old Rails Can Be Aligned and Low Joints Eliminated, Giving the Track a New Lease of Life—The Saving Thus Effectuated Is Illustrated by Various Examples—Other Track Practices Described**

By W. R. DUNHAM, JR.

Engineer Maintenance of Way, The Connecticut Company

**A**S EARLY as 1909, the writer believed there were great possibilities in the conservation of old rail. Perhaps it would be a happier term to say the non-renewal of rail, which it had been the custom to relegate to the scrap heap or sell for relayers, substituting a new and heavier section therefor. In that year I had the chance to try out the theory on a construction job, which consisted of relocating an existing single track suburban line on side location and laying a second track. The old rail in the single track was a 58-lb. low T, laid in 1894 and in good condition as far as the rail was concerned but in need of heavier joint plates, as the old plates were a light section. Heavier plates were installed, and the track is still in service and compares favorably with the second track laid in 1909 with 80-lb. low T rail. It was not until 1914, however, that it was possible to try out extensively the theory of rail conservation. In that year I was given actual charge of the maintenance of about 725 miles of track. It may be of interest to state here that in the past five years 4776 tons of old rail has been saved by the methods to be described, and the track is still in good condition. The net saving to the company during this period has been \$200,000 in the net cash value of rail. This figure is based on pre-war prices of new and scrap rail and represents the actual cash saving, taking into account the cost of the heavier rail which would have been laid and crediting the scrap value of the old rail.

Most of the rail was of plain girder or T section, a greater portion being 7-in. 70-lb. rail that had seen from fifteen to twenty years' service. A large portion was in streets paved with macadam, a pavement which was replaced, under municipal orders, with a so-called permanent pavement. In one case the rail was apparently so far gone in 1908 that a welding company had refused to weld it, its representative declaring that "it isn't worth welding." This particular piece of track was overhauled in 1914 and '15, is still in good condition and will last for a number of years. In 1914 the writer estimated eight years of life for it, but from present appearances this figure is 50 per cent low. A view of this track, taken in 1919, is given in the engraving above. The maintenance charges have been low for the past

four years, as can be seen from the figures under "Case No. 1" in the table.

The maintenance consists of building up "cups" as fast as they appear and grinding to a smooth surface. The success of most of the saving in rail was found to vary with the type of pavement used, and after investigation and study a compressed concrete pavement known to the trade as "Hassam" was adopted.

It may be of interest to say that the writer reported as follows to the general manager in 1914 on the condition of the track covered by the figures in the table under Case No. 2: "The rail on this street will last for eight years for one-third of the length, and fifteen years on the remainder, if we use the proper pavement and can purchase a welding and grinding outfit with some of the money saved. I will guarantee the joints from the bottom up, if you will give me the equipment to maintain the joints from the top down." He agreed to the proposition for this job, and in the following



REHABILITATION CASE NO. 1. THIS TRACK WAS CON-  
DEMND IN 1908 AND PAVED IN 1915 WITH CONCRETE.  
THIS PICTURE WAS TAKEN IN 1919. THE AP-  
PARENT CRACK IN THE PAVING IS A JOINT

years to 1917 inclusive, we saved more than 12 miles of track on one division, as shown by the figures in the table on page 564.

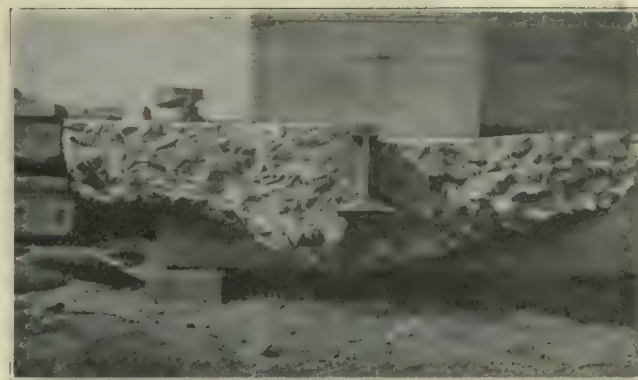
The line in question was a double track main line with five minute headway. As the city had ordered the track paved, it was obligatory for the company to do the work.

The actual work on this division was the same as if new rail was to be laid, but two innovations, as far as the company was concerned, were introduced. Steel shims were used on the ties and Abbott plates were used under the joints. The concrete extended under the base of the rail to a depth of 5 in. in pockets between the ties and then sloped up to 16 in. in depth. The rail was completely embedded for its full height, plus 5 in., and, in effect, was laid on concrete ties 16 in. wide and 5 in. thick, between the wooden ties. The concrete pavement represented one cubic yard for each 5 ft. of single track and cost less per square yard than the pavement on the city's portion, which was 3-in. Topeka on the old macadam highway as a base. The two sections of track, on page 563, show this construction. The way in which the concrete adheres to the rail is clearly illustrated in the accompanying photo-reproduction of a section of a 7-in. 70-lb. T in pavement. This rail had

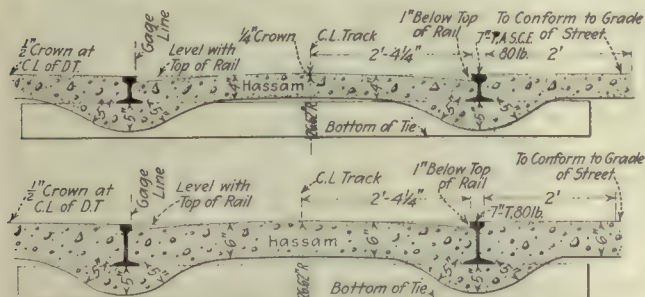


been in service for twenty years and the concrete pavement was put in place during July and August, 1915. The 4-ft. section shown was cut out in March, 1917, for inspection, the rail ends being cut 6 in. outside of the block. The 2-ft. shoulder of the paving is shown at the left-hand side of the picture. This photograph was taken in 1919.

Of course the writer understands that a cash saving in one year may be more than offset the next year by a greater expenditure; in other words, it is not true economy. The results so far obtained, however, show that the work has been a true economy, as may be seen from the statistics in the table under Case No. 3. The track to which these figures relate is shown in two ac-



THIS SECTION SHOWS THE ADHESION OF THE CONCRETE TO THE RAIL



AT TOP, CROSS SECTION OF TRACK WITH 5-IN. RAIL IN HASSAM PAVEMENT; AT BOTTOM, CROSS SECTION OF TRACK WITH 7-IN. RAIL IN HASSAM PAVEMENT

companying views, one having been taken before and the other after the track was overhauled.

In some cases it is true the saving is so small that it is a question as to the best method to pursue, and in Case No. 4, had the company been able to get new rails, doubtless the old rails would have been scrapped. Personally the writer is glad the rails were left in, however, as while they represent only a small saving they give a tangible base for judgment for work coming in the future.

Generally speaking it has been our experience that the greatest saving is made where the work must be done on the company's initiative, that is, where the

track structure is so far gone that apparently the entire structure must be renewed, since this entails a charge for entire paving as well. If the track can be saved by welding the joints and grinding, a great part of the pavement is not disturbed and the cost is thereby reduced, thus decreasing the annual charges and showing a larger saving.

The double track line represented in Case 5, on which cars ran on a five-minute headway, was in such condition that the mechanical department could tell by the condition of the cars those which ran over this line. The track was electric welded in 1908, but was so full of "dutchmen" that it looked like a Hun trench. This section was 8000 ft. long. This line had been scheduled for entire renewal every year since 1908, but other work called for by the city cut it out every year. The estimated cost for the entire renewal in 1916 was \$80,000. We overhauled it in 1917 and maintained it through 1918 at a total cost of \$2900. It was done as a temporary expedient to last until after the war. We estimated it would last three years, but from present appearances it will last five years and perhaps eight years. Views of the track before and after the work was done are published. Basing our maintenance charges for the next three years on the actual maintenance for one year, but increasing 33 $\frac{1}{3}$ % each year, we



TRACK COVERED BY CASE NO. 3. THIS RAIL IS 9 IN. IN HEIGHT, LAID IN 1894 AND ELECTRICALLY WELDED IN 1909. THE FIRST VIEW WAS TAKEN BEFORE REHABILITATION IN 1918, THE SECOND AFTER REHABILITATION





REHABILITATED TRACK COVERED CASE NO. 4

shall have saved over \$21,000 at the end of three years, as shown by the tabulation below, after allowing for interest on the investment and for depreciation.

Three years charges (new rail).....	\$25,245.00
Three years maintenance (old rail).....	3,540.00
Three years savings (old rail).....	\$21,705.00
Annual average saving (old rail).....	\$7,235.00

The writer does not believe that electric welding machines and track grinders will prolong the life of rail to such an extent that the rail mills will go out of business, nor do all types of rail permit of the methods

herein outlined, nor are the methods claimed as fitting for all properties. This statement is simply a description of what has been done on one property and may enable others under like conditions to make conservation of rail a success.

RAILS ARE BEING TILTED

We are also tilting our rails when possible; always on new construction and also when a general tie renewal is made. So far as our knowledge extends, but one other company is doing this in this country, and that is the Cleveland Railway under C. H. Clark. We are getting good results so far and understand that he is also. We believe that by tilting the rail we get less vibration with consequent less pavement maintenance. We also get better rail wear, and where old rail is head worn on the gage line, by tilting, we move the wear toward the back of the rail, and it gradually comes to the center of the head, thus increasing the life. On tram girder rail which is flanging, we can by this method throw the line of contact up from the tram and so overcome the flanging and increase the life of the rail.

On joints which have become loose and are surface bent, we use Abbott plates. The joints then "iron out" and can be kept tight. If they are cupped in addition, we build up with the arc welder and grind smooth.

We also use a vertical rail bender with good success to remove surface bends before placing the Abbott plates, if the rail is to be permanently paved. The theory in all this treatment is to provide as smooth a wearing surface at the joint as at any other part of the rail, and if possible to have the whole rail rigid. By this I do not mean a rigid base only nor a rail partly em-

TABLE SHOWING SAVINGS EFFECTED IN RAIL REHABILITATION

	Case 1	Case 2	Case 3	Case 4	Case 5
Length of track, measured as single track, ft.....	15,922	64,685	8,480	2,270	8,000
Date of rehabilitation.....	1915-16	1914-18	1918	1917	1917
Cost of new rail less scrap value of old rail.....	\$19,130.00	\$52,920.00	\$9,375.00	\$2,490.00	\$76,500.00
Interest and depreciation on new rail, per annum.....	\$1,722.32	\$4,015.44	\$1,030.25	\$273.90	\$8,415.00
Actual maintenance of old rail, per annum.....	\$513.12	\$895.92	\$815.76	\$142.08	\$2,900.00
Annual saving from use of old rail.....	\$1,209.20	\$3,119.52	\$214.49	\$131.82	\$7,235.00
Interest and depreciation per year per foot of track for new rail.....	\$0.108	\$0.062	\$0.122	\$0.121	\$1.051
Annual maintenance per foot of track for old rail.....	\$0.032	\$0.017	\$0.096	\$0.063	\$0.146
Annual saving per foot of track for old rail.....	\$0.076	\$0.045	\$0.026	\$0.058	\$0.905
Saving to date.....	\$18,617	\$52,025	\$8,560	\$2,348	\$5,515.00



THIS SECTION COVERED BY CASE 5, IS SHOWN BEFORE AND AFTER REHABILITATION. THE WORK WAS DONE IN 1917



bedded, but by a rigid rail I mean one entirely embedded in concrete except for the head and gage side. This theory has shown good results after five years practice with rail which had been condemned as too poor to weld, six years before we paved it. It has now been paved five years, or eleven years extra in all, and is apparently good for as long again. During that five years there has been no paving maintenance, and the track maintenance has been cut to \$500, or 3 cents per foot of track. On one division alone we have 12 miles of this construction, and the actual maintenance has been \$900, or one cent per foot of track.

In addition to prolonging the life of rails, we have, with the use of the electric welders and grinders, saved on one division, in one year, \$3534; also, in repairing rail breaks in permanently paved streets, the sum of

\$2000 was saved, as we repaired 127 broken rails at a cost of \$225, which under the old methods would have cost \$2286.

We have on our system three electric welders of the Atlantic type, five welders of the Indianapolis type, eight rotary and seven reciprocating grinders. In addition, we have other labor saving machines, such as steam and electric shovels, which reduce our excavating costs on large jobs 88.6 per cent below the cost by hand and pneumatic tie tampers, which give us better work at 16½ per cent less than the cost by hand, and are additionally useful in breaking out old concrete pavement at a reduced cost. We also use the pneumatic tie tampers for cleaning cement grout from salvaged paving brick. Two men with one machine can clean 250 brick per hour, making the cost 35 cents per hundred.

## A Year of the Automatic Substation at Butte

Maintenance Cost for First Year Was About \$355, More Than  
40 Per Cent Less Than Estimate—Company Plans  
to Extend Automatic Operation

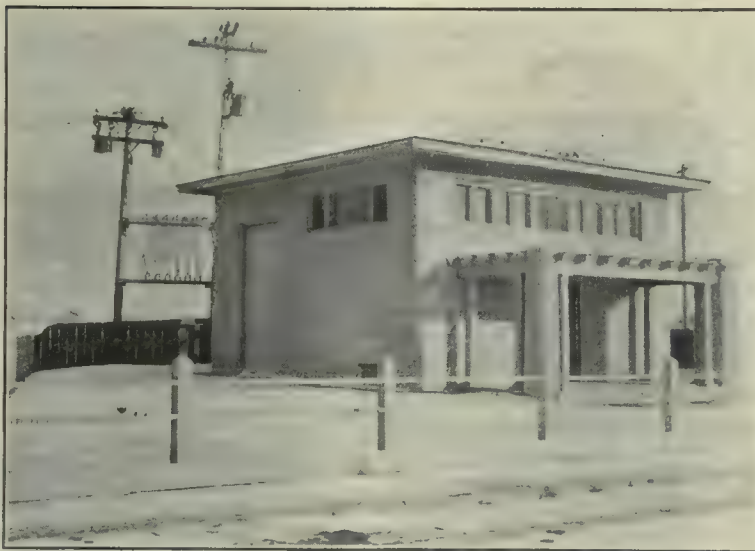
By E. J. NASH

Electrical Engineer Butte (Mont.) Electric Railway

THE design and construction features of the automatic substation have received considerable space in the *ELECTRIC RAILWAY JOURNAL* of late, but there has been comparatively little regarding operating records. The first year's operating records of one of these stations may, therefore, be of interest to the readers of the paper, particularly in view of the fact that reliability of service is of primary importance. In the following article are

mentioned also a few features wherein the automatic substation of the Butte Electric Railway differs, so far as known, from any thus far described or installed. A few comparisons are given also as to the relative characteristics of automatic and manually-operated stations containing machines of the same type, style and capacity.

The accompanying photographs show the general appearance of the substation inside and out, the equipment being that found in substations of this type generally. By way of explanation of the presence of the chicken wire netting seen on the poles in the exterior view of the substation, it may be said that this is used for resistance between the rail at the station and the negative side of the rotary in order to insure the desired condition that the voltage drop from the rail at the sta-



AN ATTRACTIVE HOUSING FOR THE AUTOMATIC SUBSTATION AT  
SOUTH BUTTE, MONT.

tion to the negative bus be the same as the drop from the rails at any other point to the bus. On account of the termination of a contract for power, and also because the company wished to take care of the return current more satisfactorily, it recently became desirable to install a new system of distribution and to use the negative insulated return-feeder system for the mitigation of electrolysis. The location of a substation at the load center of the system was consid-

ered, the cost would have been \$19,800 more for copper, plus additional annual line loss of \$1,700, than if a substation was located at the center of load distribution for the uptown district and another was located in the South Butte residential district where approximately 25,000 people reside. Even under these conditions it would have been more economical to use the copper and suffer the line loss than to install a manually-operated station in South Butte because the company pays each operator \$7 per day for an eight-hour shift. As this station would have to run at least sixteen hours a day, making an annual operating charge of \$5,110, it is obvious why the automatic substation was the economical solution of the problem regardless of an additional cost of \$9,000 for buildings, land and equipment for the rotary.



It was estimated that one day's work per week was sufficient for cleaning and inspecting the apparatus, amounting to \$364 annually, as an electrician receives \$7 per day. It was estimated that materials would cost \$256 per year, including necessary incidental sup-

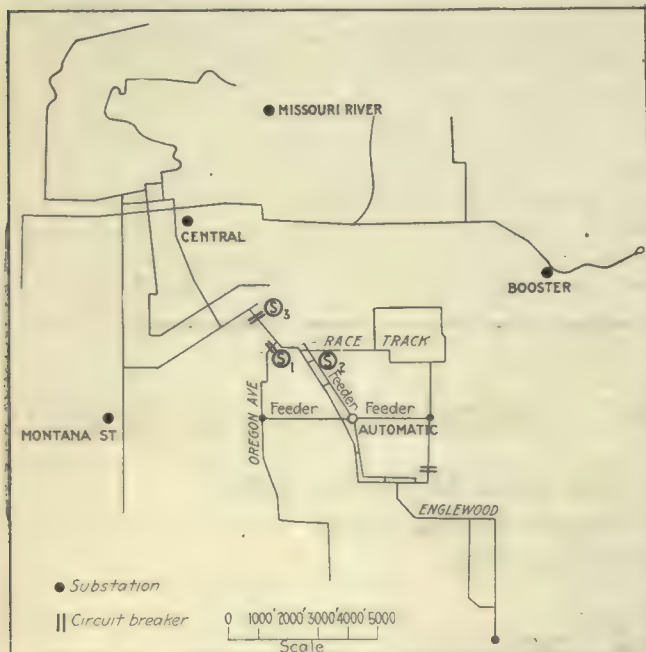


DIAGRAM OF DISTRIBUTION SYSTEM, BUTTE ELECTRIC RAILWAY

plies such as oil, waste, brushes, contacts, etc. The total annual charge for material and maintenance was thus estimated at \$620; the actual cost was \$355.80. Of the latter amount \$292 was for labor.

The automatic substation has given very reliable service, for during the year it failed but four times. On two occasions the auxiliary to relay No. 27 failed to open. This relay, as described in previous issues of the JOURNAL, keeps the station from starting when the alternating-current voltage is low. In failing the first time the clutch and trip coils were damaged, as the voltage was too low for the oil-switch motor to complete the closing operation. The damage would not have occurred had the circuit been properly fused, as it was the next time the relay failed. This time the damage was simply a blown fuse. The manufacturer of the equipment, the General Electric Company, replaced the auxiliary to relay No. 27 with a relay of a later type and no further trouble has been experienced.

On another occasion the rotary was stopped on a very hot day by the operation of the bearing thermostat. This thermostat had a lower temperature setting than was necessary and the rotary simply remained idle until an electrician arrived. On another occasion, before electrolytic lightning arresters were installed on the direct-current feeders, lightning entered the station. All the damage in this case consisted in a blown fuse and the burning off of the insulation from the wire of the lighting circuit which was tapped to the feeder.

#### AUTOMATIC IS MORE RELIABLE THAN MANUALLY-OPERATED STATION

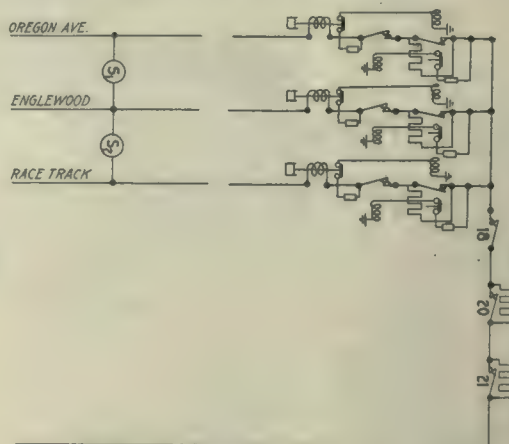
It happens that the machines in the railway company's central substation are of the same type, style and capacity as that in the automatic, so that there is an excellent opportunity to compare the operation of these

two substations. The rotaries are 500-kw., 60-cycle, 600-volt, six-phase General Electric machines, diametrically connected. The full load rating is 834 amp., and they are designed to carry 50 per cent overload for two hours and 100 per cent overload momentarily. They have flash suppressors, or arc coolers, as shown in one of the accompanying illustrations. These are the devices described by Messrs. Linebaugh and Burnham in their paper on "Protection from Flashing" delivered before the 1918 convention of the A. I. E. E., and abstracted in the issue of this paper for July 6, 1918, page 9.

The two rotaries in the central substation have flashed over, and have flashed to the pedestal. The short-circuit current for the manually-operated substation has been limited to less than 3000 amp. Although on one of the 500,000-circ.mil feeders the nearest trolley tap is more than 10,000 ft. from the substation, a pedestal flash was experienced from this circuit. By way of contrast to this the automatic substation has demonstrated its ability to handle a short-circuit without flashing. Several times when the short-circuit current would have reached a value in excess of 4000 amp., the only indication of trouble was a faint squeak. In one test the trolley wire was short-circuited to the rail within 1000 ft. of the station. In this case a flash started but it was extinguished by the wire arc coolers. This non-flashing feature of the automatic substation is worthy of consideration. It is, of course, due to the use of the flash guards and the load-limiting resistors which have a cushioning effect. These resistors could be used in a manually-operated substation to supplement the circuit breakers.

#### HOW THE AUTOMATIC CONTRIBUTES TO RELIABILITY OF POWER SUPPLY

As stated previously, lightning entered the automatic substation practically without doing any damage. It also entered the manually-operated substation, where it



SIMPLIFIED DIAGRAM OF SUBSTATION CONNECTIONS AND FEEDERS

jumped to the low-voltage release of the rotary circuit breaker and blew the instrument fuses. A bearing was burned out in the manually-operated station, also, which would not have occurred with automatic control.

The automatic substation, as will be seen from the accompanying map of the system, is located in South Butte and operates in parallel with the central substation through an automatic sectionalizing switch. The



automatic feeds three separate trolley sections, utilizing practically but one 500,000 - circ.mil feeder and the double trolley of the same circuits. This is accomplished through the use of two General Electric type SW-4 automatic sectionalizing switches at a point where two lines branch from the main line. The Oregon Avenue and the Race Track lines re-

ceive their power from the Englewood or South Butte lines through sectionalizing switches  $S_1$  and  $S_2$ .

The contactors in the automatic substation for the Oregon Avenue and Race Track feeders are used to energize these circuits to close the automatic sectionalizing switches in case they open through overload, as the breakers for the Englewood or South Butte feeders would not open to equalize the separate sections. The Oregon Avenue and Race Track feeders will (with a reduction in voltage) carry the loads of these stations in case the power is not on the Englewood section.

Instead of using a single contactor for the feeders from the automatic substation, which is in parallel with the resistor, use is made of two contactors in each circuit so that in case of a trolley break only the affected section is disconnected from the bus. As will be seen from the accompanying diagram of connections, one contactor shunts the resistor and the other is in series with the line on the line side of the contactor and resistor.

The holding coil of the series contactor is wired from the bus through the contact of a thermostat placed



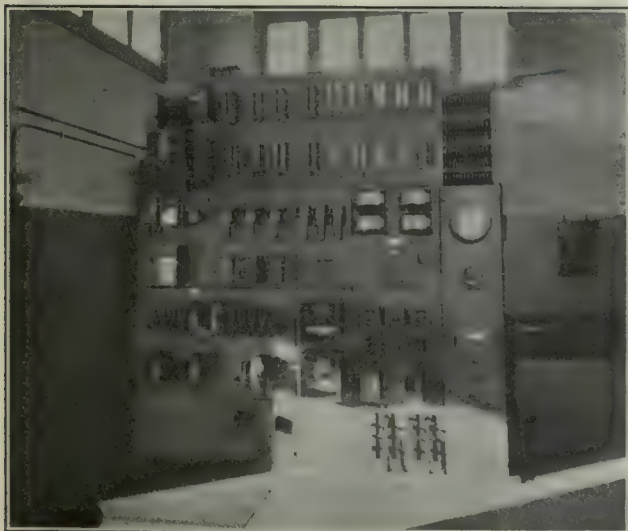
BACK OF SWITCHBOARD, WITH RESISTORS ABOVE, HEAVY CONTACTORS IN CENTER AND CONTROLLER COVER IN FOREGROUND

over the resistor of that circuit. When the shunted contactor opens, through the opening of the contact of a series overload time-limit closing relay, current passes through and heats the resistor. If the temperature of this reaches a predetermined value the contacts of the thermostat open, thus opening the holding circuit of the line contactor which disconnects the feeder from the bus. By the use of the connection of the holding coils as shown in the diagram the contactors are closed whether the station is running or not. This is necessary, for at night when the automatic substation is not running, the closed contactors furnish power for Oregon Avenue and Race Track to close the sectionalizing switches in case they open on account of overload.

The operation of the South Butte automatic substation has been so satisfactory that plans are now being made to add another substation of the same type to the system and to make the central substation automatic. By the addition of a second substation, copper to the value of \$6,000 would be recovered and this station would be available in case one of the other units failed to function. That this would be economical is evident from the fact that the three operators in the central substation are paid \$7,665 per year.

In conclusion, and for purpose of completeness, it should be stated that the population of Butte is given by the 1910 United States Census as 39,165. This figure is misleading as it includes only the inhabitants of the small area within the city limits, covering about  $5\frac{1}{2}$  sq. miles. There are a number of towns and residential sections adjoining the city with an aggregate population of about 70,000. Consequently the total population served by the railway is at least 100,000.

[EDITORS' NOTE. Mr. Nash refers to articles on automatic substations that have appeared in this paper. In this connection the table printed in the issue for Jan. 4, 1919, page 54, is of interest. It, of course, includes the equipment described by him. Helpful articles will be found in the following issues: Jan. 11, 1919, pages 84 and 104; Dec. 14, 1918, pages 1035, 1038 and 1051; Nov. 30, 1918, page 979; Oct. 12, 1918, pages 651 and 665; July 27, 1918, page 157; July 20, 1918, page 118; April 13, 1918, pages 689, 692, 705 and 707; March 16, 1918, reference by Charles R. Harte, in general article on power distribution.]

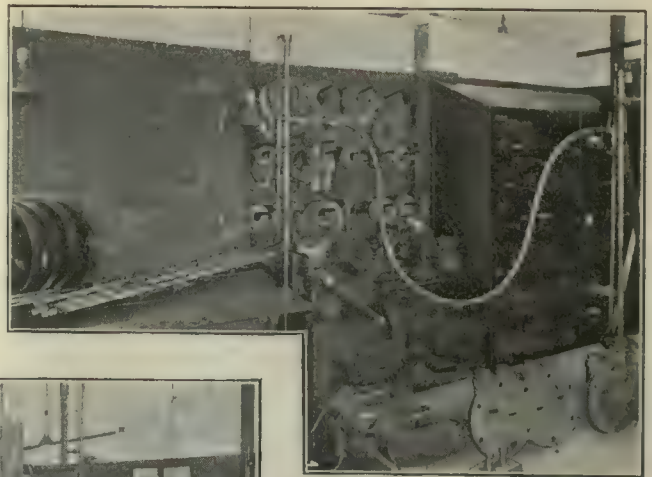


AT LEFT, MAIN SWITCHBOARD WITH CONTROLLER IN BACKGROUND; AT RIGHT, TRANSFORMERS, ROTARY AND AUXILIARIES





Compressor Overhauling Bench with Working Space on All Sides Gives Easy Access to All Parts and Centralizes Work



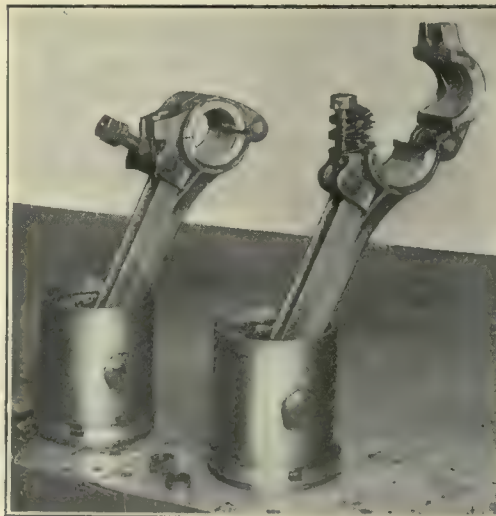
At Left (Top), Lowering a Compressor into Position for Overhauling.

In Center, Dismantling Compressors for Overhauling—Oil Reclaiming Tank Conveniently Located at Right.

At Right, Air Connection for Testing Door Engines—Gasket Rack and Air Brake Equipment Closet in the Background.

### Compressor Overhauling and Testing Bench at One of the Shops of the Brooklyn Rapid Transit Company

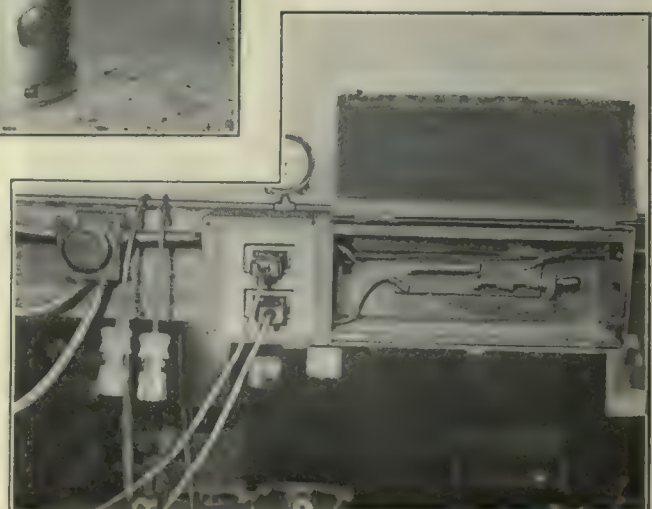
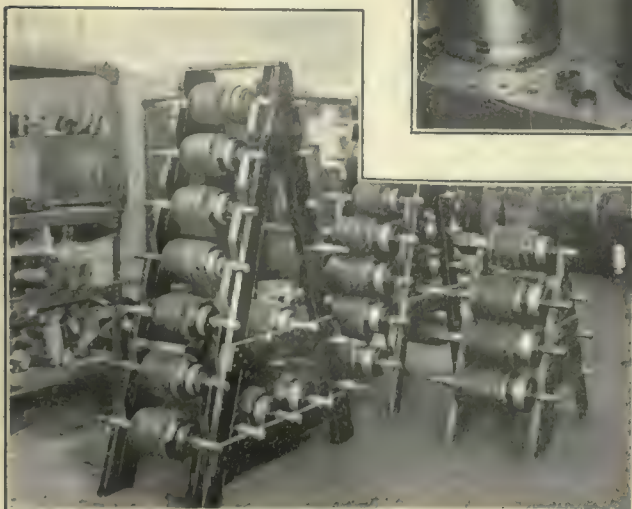
Storage Racks and Convenient Testing Equipment Facilitate the Work of Overhauling and Insure Proper Workmanship



At Left, Racks for Storing Compressor Armature and Air Brake Equipment Parts.

In Center, Connecting Rod Bearings with Shims to Provide Adjustment.

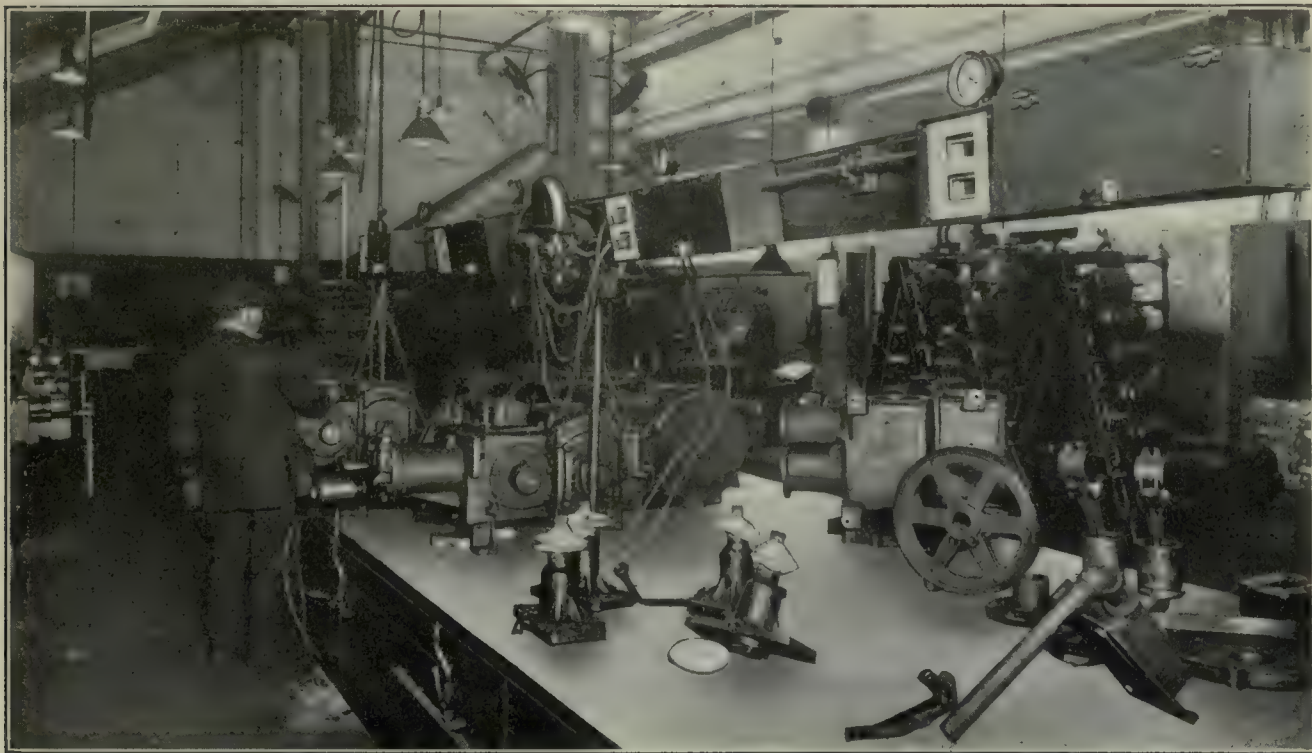
At Right, Switch, Fuse and Contact Receptacle for Testing Compressors.





# Up-to-Date Practice in Compressor Maintenance

Methods of Inspection and Overhauling Are Covered and Details  
Given of a Compressor Overhauling and Testing  
Bench with Other Labor-Saving Devices



CLEANING COMPRESSORS WITH COMPRESSED AIR ON THE OVERHAULING BENCH

**T**HE best air-brake equipment in the world is worthless unless a sufficient supply of compressed air is available. Compressors are the source of air supply and the fountain head of the air-brake system. Their proper maintenance is of the utmost importance in order to avoid accidents, to prevent annoying delays and to insure an efficient service.

The maintenance work on air compressors is properly divided into two parts. The first includes the regular inspection and light repairs that are necessary to keep wearing parts in proper adjustment. The second comprises general overhauling, which requires the dismantling and cleaning of all parts together with their renewal and reassembling with proper lubrication for the wearing parts. Both classes of work can be most effectively carried out if done on a mileage basis. Where roads have equipment that operates only in limited service, as during the rush-hour or peak-load periods, it is desirable to put a limit on the time that may elapse between inspections, otherwise a greater interval than would be safe might elapse.

The mileage allowed between inspections or overhauls depends largely on the age and general condition of the equipment and on the service conditions that must be met. Each road can best determine this for itself, as the standard used for one class of equipment may prove entirely unsatisfactory for another.

The work necessary in inspecting electrically-driven compressors is conveniently divided into: (1) Oiling

the crank case, bearings, etc., and (2) inspecting and adjusting the operating parts. Most compressors are now provided with elbows and plugs or with oil openings for determining the amount of oil in the various compressor oil chambers, and for convenience in adding necessary oil. These openings are located so that when the oil reaches to the opening there is sufficient for operation. The oil hole for the crank case commonly consists of a street elbow installed about 2 in. above the bottom. The inspector removes the plug from the elbow and inserts his finger to remove anything that might clog the opening. As he removes his finger the oil will "kick back" if the opening is free. Where the opening cannot be cleared with the finger a strand of rope with wire center will be found of value. If the oil follows back to from  $\frac{3}{4}$  in. to  $\frac{1}{2}$  in. of the top no additional oil need be supplied, otherwise sufficient oil is added to bring it up to the required height.

A careful record should be kept of the quantity of oil added, together with the car number. The first form shown on page 570 is used by the shop department of the Brooklyn Rapid Transit System for recording the amount of oil used. When the work of oiling is finished the inspector hands this report to the foreman of air brakes who checks it over carefully. Where the report shows that more than 3 pints of oil has been added to a compressor, the reports for the previous inspections of that compressor are checked. If the compressor received no oil or but a small amount on



the previous inspection the report is considered satisfactory, but if the previous report shows a large amount of oil used, the car is withheld from service for a detailed inspection to determine the cause of the excessive consumption.

The inspecting and adjusting of the operating parts is usually done by another inspector. This inspection is preceded by a wiping of the compressors with dry waste and the brushholders and insulators with cheesecloth. All brushes are examined and if too short to last until the next inspection are replaced. Brushholder tension is checked and the tension springs are kept in good condition. After this inspection the compressor is operated to see if there is any pounding of the valves or gearing or any sparking at the commutator. If sparking occurs the commutators are cleaned with a pad of cheesecloth. (Commutators should never be sandpapered. Where brushes do not fit the brushholders properly, sand paper may be used to rub them

panying illustrations is installed at the Southern Division inspection and overhauling shop of the Brooklyn Rapid Transit System. It consists of a zinc-covered platform 19 ft. long, 7 ft. wide and 25 in. high, with an open space on all sides. Such a bench will accommodate eight compressors, and all the auxiliary piping, electrical connections, storage reservoirs, etc., are arranged with eight units, so that the work of overhauling and testing on one compressor need not interfere with that being done on others.

Sixteen 14-in. x 48-in. reservoirs are installed underneath this overhauling bench. They are connected in series and piped in pairs so that each compressor can be used to charge two reservoirs. The air thus compressed in these tanks is used for various operations in the air-brake room. At the center of each side of the bench is a tap for attaching a hose so that the air may be used for blowing out and cleaning the compressors being overhauled. At one end of the bench

Form N. S. 405

Brooklyn Rapid Transit System  
MECHANICAL DEPARTMENT

March 19, 1919

Inspect the following MOTOR cars for  
Oil used in Compressors  
and put in good condition.

Car No.	Pints Added	Car No.	Pints Added	Car No.	Pints Added
921	1	1046	1	2075	2
945	2	1053	1	2086	6
954	0	1059	2	2096	3
944	0	1069	2	2105	3
950	0	1056	1	2111	6
953	1	1105	1	2131	3
954	3	1114	1	2135	5
1001	0	2009	2	2142	0
1011	1	2035	1	2155	2
1023	0	2049	1	2156	2
1006	1	2071	4	2225	5

I have inspected and put above in good condition, except the following, which must have special attention.

(Sign) C. W. T. Inspector  
No. 2114

Form N. S. 836

Brooklyn Rapid Transit System  
MECHANICAL DEPARTMENT

COMPRESSOR REPORT

DIVISION

To. Div. I & O Shop

Car No. 2122

Type of Compressor 202 F

REMOVED	CAUSE	PUT IN
Motor No. <u>1910</u> Comp. No. <u>10122</u> Arm No. <u>19710</u>	<u>Overhauled</u>	Motor No. <u>1910</u> Comp. No. <u>10125</u> Arm No. <u>19716</u>
Repairs Made		
Work Done By <u>Overhauler and Helper</u>		

13 Foreman

AT LEFT, FORM FOR RECORDING OIL USED. ABOVE, COMPRESSOR REMOVAL AND REINSTALLATION REPORT FORM

down.) Where brushes do not seat properly on the commutator a piece of sandpaper is placed on the commutator under the brush and this is worked back and forth. (Emery cloth must never be used for this work.) The leads and terminals of the compressor are inspected to eliminate loose connections. Pump valves and strainers are given a more general inspection about once every sixty days.

SYSTEMATIC OVERHAULING REDUCES COSTS AND PREVENTS ANNOYING DELAYS

The term "overhauling" is used to include the removal of the compressor from the car, the dismantling of all parts, the cleaning and renewing of the parts as necessary, the replacing of all broken or excessively worn parts and their reassembling with proper lubrication. After the compressors are placed in the best possible condition they are given a running test of about six hours duration before reinstallation on cars.

Such an overhauling can be best and most quickly done on an overhauling bench specially constructed for convenience and thoroughness in carrying out the work. The compressor overhauling bench shown in the accom-

a connection is provided so that the air may also be used for testing and adjusting door engines, more than 7000 of which are used on this property. At the other end of the bench there is a connection to the air hoist which is used for handling the compressor while it is being overhauled.

A bench for overhauling other air-brake parts extends along the wall at the side of the compressor bench, and the reservoirs also supply air to this bench. A board extends over the top of the compressor overhauling bench for supporting the various contact boxes, switch and fuse boxes, gages and governor used with the electrical connections to the compressors. This board is 11½ in. wide and is supported by a 1-in.-pipe framework 4 ft. above the top of the bench. The contact boxes have two contact fingers, one for the positive and the other for the negative side of the compressor connections. The boxes are made of asbestos lumber and are fireproof. At one end of the leads used for connecting to the compressors is a plug contact. This consists of a flat piece of hard rubber with copper plates on either side. By shoving this between the contact fingers in the box the electrical connections are made.



At the other end one of the leads is provided with a knuckle joint connector for connecting to the compressor field and the other has a brass ferrule for insertion in the brushholder. These connections can be made very readily. Each individual testing circuit is protected by a 10-amp. fuse and a knife switch. A single governor regulates the cutting in and out of the compressors while being tested but each is provided with a separate air gage.

The bench is lighted with eight drop lights with shades. Extension cords are used where the light is needed closer to the work.

#### VARIOUS STEPS IN COMPRESSOR OVERHAULING

When a compressor is removed from a car, the car number is painted on one of the compressor cylinders for reference and use in making future records. The compressors are handled from the cars to the overhauling room on low shop trucks, and all handling inside the air-brake room is by means of an air hoist which runs on an I-beam the entire length of the room and directly over the air-compressor overhauling bench. All control of the hoist is from the floor. An accompanying illustration shows a compressor being placed in position on the bench for overhauling.

The work of overhauling a compressor can best be carried on by two men. One should be a skilled workman and the other a helper. The helper can place the compressor on the bench and clean off all grit and dirt carefully, which is the first work to be done on the bench. He can then dismantle the various parts by removing the crank and gear case heads, the connecting rods, gear and pinion. The overhauler should take out the crankshaft, the armature, brushholders and both fields. All of these parts are placed alongside the compressor on the bench.

When all parts but the bearings have been removed from the shell, the helper can drain off the oil and empty it into the reclaiming and settling tank. He should then clean the inside of the shell carefully and paint with an insulating paint. The foreman makes a record of the compressor number, the car number from which it is removed, the motor number and the number of the armature. The armature is then removed from the bench and placed in an armature rack. Later it is sent to the electrical repair shop for a thorough overhauling and testing before it is again returned to service.

The work done in the electrical repair shop to compressor armatures received consists first of a thorough cleaning, after which they are given a careful inspection and test to determine just what repairs are necessary. Any grounds or short-circuits in the winding are cleared, open-circuited coils are replaced and in some cases the armature is entirely rewound. It is the practice to slot all commutators of compressor armatures, and when received in the electrical repair shop they are reslotted where necessary. After the repairs are completed and tests show everything in proper condition, the armatures are dipped and baked. This process of dipping and baking complete armatures was described in the ELECTRIC RAILWAY JOURNAL for June 15, 1918, page 1149. On the Brooklyn Rapid Transit System it is the practice to bake the armatures until the reading on a voltmeter connected as below is less than 10 volts. These tests are made without removing the armatures from the oven by connecting one terminal of a voltmeter to the 550-volt shop circuit while the

other is connected to the commutator segments, the armature shaft being grounded during the test. Results from these tests show that this voltage reading increases when the baking is first started, due to the expanding of the coils and the evaporation of moisture. After a certain maximum is reached the voltage reading decreases again. In testing armatures during this process it is thus necessary to take a sufficient number of readings to make certain that the voltage drop will decrease with further baking after the specified minimum of 10 volts is reached. After baking, the commutators are given a light cut to remove the insulating compound, and after a final test of the voltage drop between each coil the armature is returned to the maintenance shop for reinstallation.

Upon removing the fields from the compressor they are tapped and sounded to determine if they have become overheated or baked so as to damage the insulation. The fields are then washed off with gasoline and painted with three coats of insulating paint. No special attempt is made to return the same fields that are

BROOKLYN RAPID TRANSIT SYSTEM MECHANICAL DEPARTMENT COMPRESSORS RECEIVED - OVERHAULED DAILY REPORT									
Division		Shop, Date, March 15, '19							
Received From					Overhauled:				
Type	Caprress Number	Car	Shop	Type	Caprress Number	Armature Nos. Removed	Instld	Returned to Car	Shop
D2F	70/22	2/22	SD	D2F	70/22	2/507	2035	SD	
J. M. L. Superintendent									

#### COMPRESSOR OVERHAULING REPORT FORM

removed to the compressor. Several spare fields are used for carrying on the work and to prevent delay in finishing the work of overhauling.

#### WEARING PARTS SHOULD BE CAREFULLY GAGED

With all parts cleaned the overhauler begins by gaging the bearings. This is done by putting the crank shaft in place and testing for excessive play. The tendency of the bearings is to wear egg shaped from the continual lifting action. If the overhauler finds too much slack he calls this to the attention of the foreman who decides on the renewal of all bearings. With the pistons and rings cleaned the overhauler tries these for wear in the main cylinders. The crank shaft is placed first in one piston and then the other and worked around to determine the amount of slack there is on the connecting rod. When originally installed these connecting rods have about eight shims between the edge of the housing. If there is any play these shims are removed one at a time until the play is properly taken up. The connecting rods run for two or three overhauls after which it is necessary to rebabbitt them at which time the original number of shims is again used. The gears and pinions are inspected for wear and are renewed as found necessary. The pinions of course wear much faster than the gears.

#### ELECTRICAL PARTS ARE ASSEMBLED LAST

With all mechanical parts assembled attention is next given the electrical end of the compressor. The fields are first installed and connected up, then the armature is installed. Before installing the armature, however, this is tested with 550 volts through a four-



light cluster. This final voltage test saves much trouble and time as it insures the armature as being free from grounds or short circuits. As the armature now put in is not the one removed, the armature bearings may not fit. If such a condition is found new bearings will have to be installed which match up with the armature shaft.

The brushholders removed are taken apart and carefully cleaned. Insulators are inspected for any weakness and renewed where necessary. When the brushholders and brushes are reinstalled the brushholder springs are adjusted. These are usually set with a tension of from 2½ to 3 lb.

With all parts reassembled sufficient lubricant is added to last till the next inspection and the compressor is given a running test of six hours' duration. Any imperfectly fitting gaskets or improperly tightened connections will be weeded out by this test so that when the compressor is again installed on a car there is no danger of something unexpected happening.

Simple and accurate records are necessary for an intelligent following of the work of overhauling. For compressors ordinarily a card record system showing numbers of compressors, motors and armatures that are installed on each car with the dates of overhauling and armature changes should be sufficient. For furnishing this information to the record department some specific forms are necessary for shop use. Accompanying illustrations show two such forms used by the Brooklyn Rapid Transit System. One shown on page 570 is a compressor overhauling report made out by the overhauling foreman to show the changes in compressor equipment for a particular car. The other form shown on page 571 follows the course of a particular compressor in removing, overhauling and reinstalling it.

## A Convenient Signal Testing Board

A Portable Device Well Adapted for Instructing a Class of Men and for Testing Signal Equipment

**A**FTER a block of automatic signals has been overhauled in the shop, the signals should be completely tested as a pair and with normal operating current before being put out on the line again. This involves considerable temporary wiring which must be duplicated each time. To obviate this the Nachod Signal Company of Louisville, Ky., has designed a combined testing and demonstration board which is furnished complete, or if desired the blueprints and specifications will be furnished separately so the board may be made by the railway company. A pair of signals need merely be connected to the fanned-out cables at each end of the board, the power switch closed, and the signals can be actually operated by touching the miniature "contactors" on the trolley plan.

The accompanying illustration shows the board complete, which is self-contained and portable, so that it may be hung on any wall and connected to the 600-volt source of power. The middle part of the test board is occupied by a plan of the trolley wire with its branches at the ends for turn-out or double track. In relative position near the frogs are the trolley contactors, formed of bare wire and adapted to be bridged by the improvised trolley held in the hand, and made of insulated wire bared. To avoid distraction all connections are on the rear of this demonstration section, and the remainder of the board is curtained off. The signals are

connected to the cable and placed on stands about in their relative positions, but turned 90 deg. from their normal position so that the indications at both ends of the block may be seen from the front of the testing board.

This portable arrangement is well adapted for use in instructing a class of platform men, since any operating condition may be produced at will and the signal simultaneously observed. Of course this only supplements without displacing instruction in actual operation on the line itself.

At each end of the trolley plan are the switches and fuses as arranged in the junction or fuse box on the line; and the maintainer may duplicate the actual code of line tests here. At the extreme right, besides the fuse and power switch, are some special connections embracing two switches, five lamps and a pair of testing



TESTING A PAIR OF SIGNALS BEFORE RETURNING THEM TO SERVICE

pointers with insulated handles. These enable one signal without its mate to be tested out at reduced current for observation, the several individual circuits being energized by throwing the proper switches. One combination connects the pointers to a "live" bank of five lamps for testing grounds, open circuits, etc. Such a board may thus be used to compare a damaged with a perfect signal, or parts of a signal, to reproduce any questioned signal operation, to locate any difficult signal trouble, to study the circuits and to hold an emergency block in readiness while utilizing it for instruction purposes.

## Skip-Stop Operation Gives 11 Per Cent Reduction in Power Consumption

**T**HE United Railways of St Louis inaugurated the skip stop on Sept. 22, 1918, in accordance with the request of the United States Fuel Administration. The distances between stops in the residence districts were selected to comply with the recommendations of the Fuel Administration although little change was made in the business district. The consumption of energy in kilowatt-hours per car-mile in the months of October, November and December, 1917, was 4.34, 4.32 and 4.38 respectively. With little change in the schedules the figures for the same months of 1918 were 3.74, 3.88 and 3.96, indicating a reduction of about 11 per cent. It is expected that a much greater saving would have been effected by the further rearrangement of schedules which was under consideration at the time the company was compelled to abolish the skip stop on Jan. 25 of this year.



# There Is an Intimate Relation Between Bond and Joint Maintenance

Practice on Harrisburg Railways Shows Economy of Keeping Up the Joints in Connection with Testing and Repairing of Bonds

By G. B. MOIST

Engineer Harrisburg (Pa.) Railways

UNTIL recently the entire system of the Harrisburg Railways, comprising about 73 miles of city and suburban track, and operating about sixty cars, was supplied with power from one central direct-current power plant. On several lines the transmission distance was more than 10 miles, necessitating for satisfactory operation that the track bonding be maintained in the best possible condition.

## STEEL BAR USED AS CROSS BOND

The standard type of bonding on this property has consisted of two No. 00 capacity, screw compressed terminal bonds, installed under the plates of each joint. Around special work, 36-in. cable bonds, lengthened by cutting in two and soldering in lengths of annealed trolley wire to give the desired length, were used. In addition at least one bond was installed in every joint.

Cross bonds were used about 600 ft. apart in city districts and 1000 ft. apart in suburban districts. In open track some trouble has been experienced with these

cross bonds due to their being cut off and stolen. Where such theft is liable to occur, a bar of iron is laid parallel with the ties, having about 6 in. at each end bent parallel with and close to the webs of the rails, as shown in an accompanying illustration. These ends are drilled and short bonds are installed to connect the bar with the rails. In order to secure uniformly good results in bonding work it was considered necessary that the workmen be made to appreciate the importance of the job. To insure this the work was placed under the direction of the electrical department, and a special group of men possessed of the

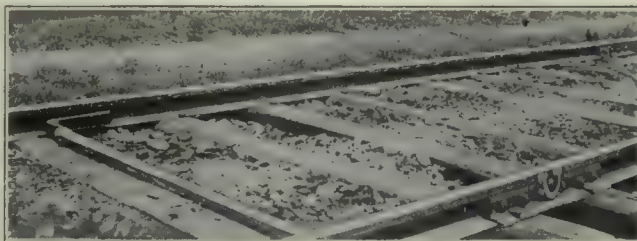
necessary training was assigned to it. Their responsibility starts with the lining up of the rails and the drilling of the holes with an electric drill. The holes are then polished by drawing a clean rag back and forth through them, an important operation, especially if a drilling lubricant is used. The bond terminals are polished also, and the terminals are inserted in the holes and compressed with as great a pressure as can be secured with the tools available. In purchasing bonds we specify that the terminals shall be

machine finished, instead of cast, so that a neat driving fit can be obtained.

In applying the bond terminals we are particular to see that the screw point is at least  $\frac{1}{16}$  in. smaller than the hole in the rail. (See sketch.) Experience indicates that proper compression is sometimes prevented by too great a diameter of screw point.

After the bonds have been compressed, the bonding gang applies the plates, a part of the work which we regard as very important. All scale or rust that may be on the contact points of the rails and on the joint plates is first removed with a wire brush. A lubricant is then brushed over the surfaces, and the plates applied and tightened, care being taken that they settle back evenly at the top and bottom. For the past few years we have used heat-treated bolts, thus reducing considerably the troubles from loose bolts and joint plates. We found that many bolts are damaged when first drawn up, as it is easy for a man pulling on the end of a 3-ft. wrench to twist off the end of an ordinary

$\frac{1}{2}$ -in. bolt. Even when bolts are not actually stretched, they are brought very near to the elastic limit so that the additional stress due to passing cars stretches them and eventually produces loose joints. Heat-treated bolts, with an elastic limit of not less than 75,000 lb. per square inch, are unlikely to be damaged in this way. Our maintenance work is confined almost entirely to track laid on open ballast. In first-class construction, as used in paved streets, we never have broken bonds, and practically no depreciation of the terminal contacts or the strands. As representative of the results ob-



ABOVE, STEEL BAR CROSS BOND FOR OPEN TRACK.  
BELOW, TESTING CREW WITH COMPLETE OUTFIT,  
AT WORK ON OUTLYING SECTION OF TRACK

tained in track of this character, the results of a series of tests on twelve joints in track that was constructed in 1908 are given in the table on page 574. The data given are the milli-voltmeter readings taken on 3 ft. of solid rail, as compared with simultaneous readings on 3 ft. of rail including the joint. One set of readings was taken in 1915, and the other set in 1919. There are no corresponding records of the joint conditions at the time of construction. The piece of track containing these joints is not far from the power plant



and has been carrying a fairly heavy current continuously for about eleven years.

In track laid in open-ballast construction, where expansion and contraction must be allowed for in the joint,

MILLI-VOLTMETER JOINT READINGS ON DATES  
FOUR YEARS APART

Joint Number	1915		1919	
	Rail	Joint	Rail	Joint
1	15	15	10	10
2	12	14	10	12
3	12	17	10	10
4	10	14	6	10
5	14	16	7	7
6	10	14	7	8
7	15	15	8	10
8	13	14	9	11
9	10	10	5	7
10	11	11	12	12
11	14	17	9	10
12	10	11	12	13

the strands of the bonds frequently break. It often happens that the expansion and contraction of several rail lengths take place in one joint, breaking the bonds in comparatively short time. It has been our practice to test track of this type of construction once or twice each year.

The testing outfit used consists of a milli-voltmeter having two faces. A frame which carries three contact points spaced 3 ft. apart is placed on the rail, the joint being between the center contact and one of the outside contacts. This arrangement gives the drop in

yield reasonably large deflections of the pointers of the milli-voltmeters. This makes it necessary on outlying track to draw some current for measuring purposes specifically. In such cases we use a few standard car resistance grids mounted on a light auto truck for connection to the trolley and track some distance beyond the point where the tests are being made. This outfit draws about 100 amp. of current, which is sufficient for ordinary testing.

The most satisfactory procedure in making tests and repairs is to assemble a force of four or five men equipped with the testing outfit and all tools and materials necessary to make the repairs, taking them to the work on the auto truck. On arrival at the track to be tested, two men start out with the testing outfit and are followed by the others, who repair the joints marked by the testers. A fair day's work will cover the repairs of from fifteen to sixteen joints, distributed over 2 miles or more.

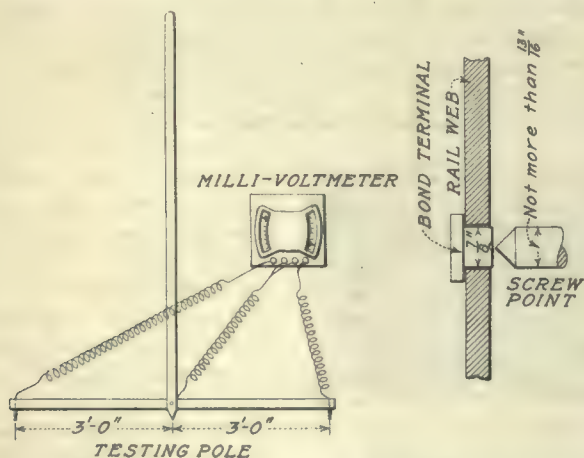
We find that the auto truck is extremely convenient in transporting the extra tools and supplies, and in getting the men to and from the work. The truck is not assigned exclusively to this work, but is used as a general utility truck, and is constantly in demand. Repairs to bonding and joints are made at such times as the men and equipment can be spared from larger construction jobs.

#### TWO TO THREE PER CENT OF JOINTS NEED REPAIR ANNUALLY

The number of joints tested each season is from 7000 to 8000. Of this number from 2 to 3 per cent require repairs. The repair work covers track equipped with several types of joints, including ordinary channels, Weber and continuous joints. No type seems to be exempt from some necessity for repair. The labor cost per joint repaired is from \$1.25 to \$1.50. This cost may seem high when compared with those involved in applying the bonds on the outside of the plates by the acetylene or arc-welding methods. We are inclined to believe, however, that we gain a great deal in the fact that our bond maintenance includes the correcting of mechanical defects in the joints, such as loose bolts, worn joints, plates, etc. This is really a part of track repairs, and a portion of the expense could properly be charged to that account.

To replace the bond without correcting the cause of its failure invites a second failure in short time. Removing the plates and replacing worn parts with new where necessary, insures that the joint is left in the best possible condition.

About three years ago we changed the type of bonding in track laid in paved streets. The copper bonded joint was replaced by an arc-welded joint. Standard channel plates, with the addition of a heavy sole plate, were arc-welded to the base of the rail. Tests made at that time showed the joint equal to the rail electrically and without a doubt it is a good joint mechanically. Recent tests show the joints to be in the same condition as when installed. This practice is now standard with us for the given type of construction, but we are not yet convinced that the application of the welding method of applying bonds to open ballasted track is a superior method as to final results. For the reasons outlined above, it is likely that we shall continue to use our present methods of construction in such track for some time to come.



OUTFIT FOR BOND TESTING—RELATION OF COMPRESSOR  
POINT AND BOND TERMINAL DIAMETERS

3 ft. of solid rail on one face of the instrument and a like amount of rail, including the joint, on the other. To insure good contact with the rail pieces of hacksaw blade have been found to be most effective. These are located as shown on the diagram of the test outfit.

#### WHEN IS A JOINT IN NEED OF REPAIR?

Our standard in determining the condition of the bonds in a joint is that the drop, in milli-volts, of 3 ft. of rail including the joint shall not exceed twice the drop of 3 ft. of continuous rail. Any joint exceeding this amount is opened and repaired. Operators on these tests become quite skillful in observing the readings, and are able to detect a defective bond that has even less than 25 per cent of its strands broken.

On some lines, especially toward the outer end of a line, the current flowing in the rails is small and intermittent in character, making slow work of the testing. Obviously the best results are secured when the current is reasonably steady and of a magnitude sufficient to



# Equipment Inspection on a "Kw.-Hr." Basis

Reasons for the Superiority of Maintenance on an Energy Basis, as Compared with a Time or a Mileage Basis, Are Pointed Out

By WALTER C. BOLT

Investigating Engineer Bay State Street Railway, Boston, Mass.

**T**HE Bay State Street Railway, operating more than 900 miles of line in eastern Massachusetts, recently completed an installation of the Economy railway watt-hour meters.

While the meters were installed primarily for the purpose of saving power, they have been found to be of equal value and importance in other ways, the principal additional value being their use as a basis for determining when car inspections should be made. Until recently cars on the Bay State were inspected on the time basis, but it has been the ambition of the management for some time to replace the time basis of inspection by the mileage basis. In view of the scattered distribution of cars and the interchange of cars among the several divisions of the property, it was found practically impossible to obtain mileage data with a sufficient degree of promptness to enable car inspection to be done on the mileage basis. With the advent of the Economy railway meter a solution of the problem presented itself.

Regarding the use of the meters in connection with power saving it is too early to permit concrete figures to be given as to the extent to which power is being saved, but in general the results are very satisfactory and a good saving is being made. The motormen over the entire system are taking hold of the power-saving campaign in good spirit and are displaying very much interest.

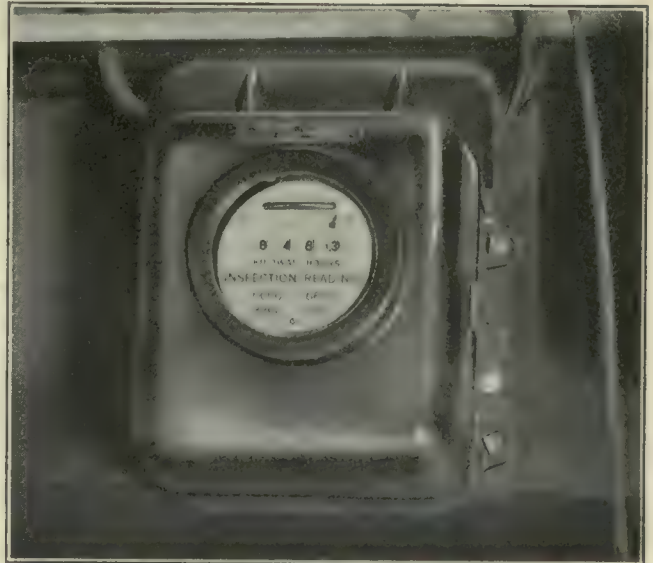
Pending the development by the manufacturers of a device to be used in connection with the meter dial to indicate when a car has used a predetermined number of kilowatt-hours, and thus to show without reference to any other records that the car is due for inspection, the Bay State is using paper auxiliary dials on which are printed the readings at which the car is due for inspection.

This plan of using the "power-saving" meters to show when cars should be inspected was first tried out for two months on one of our divisions, and it proved so satisfactory that our entire system was placed on the kilowatt-hour inspection basis in November, 1918. The following are some of the principal reasons why car and equipment inspection on a kilowatt-hour basis is more proper than inspection on a mileage or time basis:

1. When a car has consumed a predetermined number of kilowatt-hours, the information is made immediately available, and the car can be inspected without delay and without any clerical labor. At best on roads where inspection is based on mileage the necessary data are usually not available until at least 24 hours have elapsed.

2. Elapsed time between inspections is not necessarily a measure of work done, particularly where the car-mileage is not somewhat equally pro-rated as between cars.

3. Most parts of a car require inspection at intervals proportionate to work done. Mileage run between inspection intervals is not necessarily a measure of work done.



CAR METER WITH CARD ON DIAL SHOWING ENERGY CONSUMPTION INSPECTION INTERVAL

4. Kilowatt-hour consumption between inspection intervals is a more nearly correct measure of work done by the essential parts that wear and need inspecting. (a) All electrical equipment depreciates and wears in direct proportion to the power consumed by motors. (b) The wear of truck parts, brakeshoes and wheels is dependent upon speed, stops per mile, condition of track, etc., all of which have an influence upon power consumption.

5. If a motor is working unsatisfactorily for any reason, such as faulty connection, open armature coils, short fields, etc., more power will be consumed and the car will therefore be brought in more frequently for inspection on the kilowatt-hour basis than on the mileage basis.

6. If a car is on an easy-schedule line, having infrequent stops and low grades, it will consume less power than a car operating on a difficult schedule with frequent stops and severe grades. On a mileage or time basis each car would receive an equal number of inspections. On a kilowatt-hour basis less inspection would be given the car operating on the easy schedule and thus a substantial saving in labor would be effected.

7. If two cars of the same type and same motors are running in the same service but with different gear ratios, the car with an improper gear ratio will consume more power and therefore come in for inspection more frequently.

8. If a car has binding or tight brakes, or a tight center bearing, it will consume more power and automatically come in more promptly for inspection and correction of trouble.

9. If a car is handled roughly or improperly by motormen it will consume more power, and therefore



will need inspection more frequently than one which is properly handled. Inspection on a kilowatt-hour basis automatically brings this car in for inspection more promptly.

10. Another factor which tends to make kilowatt-hour inspection more accurate is that power used by cars in switching at carhouses and between carhouses and shops is recorded. The meter is on the job every minute and records even when a car is used only for a very short distance. This miscellaneous mileage is usually totally lost in figuring mileage by cars and is, therefore, not taken into account when cars are inspected on a mileage basis.

It is interesting and gratifying to note that the kilowatt-hour method of inspection is not only more accurate and prompter than the older methods, but it also brings about very substantial economies in decreasing the number of car inspections and yet makes provision for care of cars and equipment in accordance with actual work done. The following is an abstract of the general instructions regarding local inspection of cars:

Extract from General Instructions Regarding Local Inspection of Cars

In carrying out the plan for inspecting cars on an energy basis the following forms have been developed:

The Economy meter inspection cards will be used by the rolling stock department, carhouse repair men and inspectors to record inspection of individual car parts. A rack will be installed at the carhouses on which these cards will be placed.

The form previously used for entry of nightly meter readings has been modified to provide an additional column headed "Due for Inspection." This form has been filled out by the transportation department representative, who took the register readings and at the same time filled in the meter readings. This form is made up in duplicate, the original being forwarded immediately to the power-saving department, Boston. The duplicate is turned over

POSTER SHOWING INSPECTION INTERVALS FOR CARS OF SEVERAL WEIGHTS

Car Weight in Pounds	Watt-Hours Per Ton-Miles	Kilowatt- Hours Per 1000 Car-Miles	Kilowatt- Hours Inspection Interval	Car-Miles Per Inspection Interval
18,000	150	1,350	1,250	930
19,999	150	1,500	1,250	835
20,000	150	1,500	2,000	1,330
29,999	150	2,250	2,000	890
30,000	150	2,250	2,500	1,110
39,999	150	3,000	2,500	835
40,000	150	3,000	3,300	1,100
50,000	150	3,750	3,300	880
59,000	150	4,400	3,300	750

The above is the basis in which inspection intervals were determined. We endeavored as nearly as possible to place cars on a 1000-mile basis, but until such time as a special mechanical device is developed, we are limited in choosing inspection intervals to such units as are a multiple of 10,000, the capacity of the meter. It is obvious in this inspection method that a car of any given weight, equipped with old and inefficient type of meters, will come in for inspection more often for a given mileage than will a car of the same weight equipped with modern and up-to-date motors.

Moreover a car that has improper gear ratio for the conditions under which it operates will come in more often for inspection than will a car with proper gear ratio.

to the local rolling stock department carhouse foreman. Prior to turning the form over to the carhouse foreman the local transportation department carhouse foreman notes the cars due for inspection on the following day and so arranges his car assignments, traffic permitting, that the cars may be inspected. Upon receipt of the form by the rolling stock department carhouse foreman the Economy meter inspection cards are placed in the rack indicating the date and the number of the cars to be inspected.

The first car inspector removes the cards from the rack and places them in metal containers attached to some part of the car. The several car inspectors then proceed with their inspections and place their initials opposite the names of the parts inspected together with the dates. The last inspector removes the card container and the card from the car and returns the card to some specified place in the rolling stock carhouse foreman's office. The foreman then, in general, goes over the inspection work and signs the card. Dial sections have been developed and placed on all meters to indicate the energy consumption inspection interval (see halftone illustration). As soon as the energy consumption as shown by the meter dial approximates any of the readings on this supplementary dial, notation or check mark is placed opposite the car number and the meter reading on the form described above.

Both meter inspection cards and reports of daily meter readings are filed in the local rolling stock carhouse office. On the

FORM 041A  
CAR NO. \_\_\_\_\_ DATE DUE \_\_\_\_\_ INSP. No. \_\_\_\_\_

CAR STATION \_\_\_\_\_ METER READING \_\_\_\_\_

BAY STATE STREET RAILWAY COMPANY  
WALLACE B. DORHAM, Receiver

ECONOMY METER INSPECTION CARD

PART INSPECTED	DATE	BY WHOM	PART INSPECTED	DATE	BY WHOM
Motors			Spare Lamps		
Arm. Clearance			Arc Headlights		
Wipers & Yokes			Inch'd w/ H 3817s		
Leads			Roofs		
Gears & Pistons			Motormen Steps		
Gear Cases			Roof Handle		
Bolts			Signs		
Trucks			Drawbars		
Wheels			Fenders		
Journals			Snow Scrapers		
Air Brakes			Grab Handles		
Air Equip'm't			Sand Boxes		
Hand Brakes			Sand Spouts		
Brake Valves			Foot Gongs		
Air G-ge & Lamps			Bells		
Master Controller			Bell Cords		
Motor Controller			Registers		
Meter			Register Cords		
Contactors			Razzer and Buttons		
Reverser			Seats		
Resistance			Cushions		
Circuit Breaker			Curtains		
Clr. Risk Reset			Door Glass		
Fuse Boxes			Doors—Body		
Spare Fuses			Door—V-tubule		
Switches			Window Glass		
Lifting Arresters			Window—Body		
Trolley			Window—V-tubule		
Trolley Hooks			Hand Straps		
Trolley Catchers			S. Bars on O. Cars		
Door Engines			Floors and Traps		
Car Wiring			Steps & R-rig Bds		
Heaters			Screens		
Lifting Circuits					

REMARKS \_\_\_\_\_

SIGNED \_\_\_\_\_ FOREMAN CAR REPAIR

CAR NO. \_\_\_\_\_ DATE \_\_\_\_\_ INSP. NO. \_\_\_\_\_

THIS CAR HAS BEEN INSPECTED AND IS RELEASED FOR SERVICE

AT \_\_\_\_\_ A.M. \_\_\_\_\_ P.M. \_\_\_\_\_

SIGNED \_\_\_\_\_ FOREMAN OF REPAIRS

INSPECTION RECORD FORM, ON CARDBOARD, 3 1/2 IN. x 8 1/2 IN. IN SIZE

BAY STATE STREET RAILWAY COMPANY  
WALLACE B. DORHAM, Receiver

FOREIGN CAR INSPECTION NOTICE

Mr. \_\_\_\_\_ Trans. Foreman \_\_\_\_\_ Car House. \_\_\_\_\_

Confirming telephone notification of this date you are hereby advised that the following cars require inspection on \_\_\_\_\_ 19\_\_\_\_, as indicated by meter readings.

Car No.	Meter Reading	Car No.	Meter Reading

These cars will be scheduled to reach your car house.

Signed \_\_\_\_\_ Foreman, \_\_\_\_\_ Car House.

FORM USED TO NOTIFY TRANSPORTATION DEPARTMENT FOREMAN OF FOREIGN CARS DUE FOR INSPECTION

BAY STATE STREET RAILWAY COMPANY  
WALLACE B. DORHAM, Receiver

DAILY ECONOMY METER READINGS

Division \_\_\_\_\_ Car House \_\_\_\_\_

Foreman \_\_\_\_\_ Date \_\_\_\_\_ 191 \_\_\_\_\_

CAR NO.	METER READING	DATE FOR INSPECTION	CAR NO.	METER READING	DATE FOR INSPECTION	CAR NO.	METER READING	DATE FOR INSPECTION

(White) Original to Power Saving Department.  
(Yellow) Duplicate to Rolling Stock Department.  
\* Place Check in this Column opposite Car No.  
Due for Inspection as indicated by tabulation on Meter Dial.

BY CHANGE \_\_\_\_\_

FORM (8 IN. x 11 IN.) SHOWING CARS DUE FOR INSPECTION



inspection card a space is provided for entry of a number of the inspections. For example, the card covering the first inspection of any car on this basis is card No. 1, the next card is No. 2, etc.

Cars marked for inspection are to be reported immediately by telephone, confirmed in writing, to the transportation carhouse foreman of the carhouse from which the car regularly operates. A foreign car should be routed so that it may be taken in at the carhouse from which it regularly operates, for inspection at the earliest possible time.

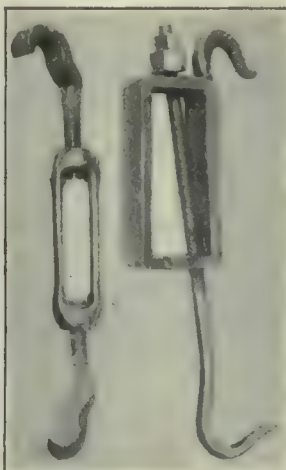
A special form has been developed for notification regarding foreign car inspection. This is printed in triplicate, the original and duplicate to be forwarded to the transportation department foreman in the car house from which the car regularly operates, the original being retained by the foreman and the duplicate being turned over to the rolling stock department carhouse foreman. The triplicate copy is retained by the man making out the notification.

The above instructions are not to be interpreted in such a manner as to relieve the rolling stock department carhouse foreman of the responsibility for proper inspection of cars when due. Close co-operation between

## "Butterfly" Turnbuckle Provides for Straight Pull

As a Shop Tool It Is of Great Convenience for Producing the Necessary Slack in Sprocket Chains to Renew Broken or Worn Links and Pins

IN REPLACING broken links in the sprocket chains of sweepers and other miscellaneous railway equipment, it is necessary to bring the broken ends of the chain together sometimes under considerable tension. One of the most common methods for doing this is to insert a turnbuckle at the point where the link is to be renewed and by tightening this the ends are brought sufficiently close so that the new links may be applied. The ordinary form of turnbuckle as manufactured is rather inconvenient, as the ends must be provided with hooks which project above the center line of the turnbuckle. The pull on the turnbuckle is then not straight through its center and it is often found very difficult to take up sufficient slack in the chain for inserting the new links. It is also somewhat inconvenient to turn



AT LEFT, OLD TYPE OF TURNBUCKLE USED FOR RENEWING LINKS OF SPROCKET CHAIN ON SWEEPER; IN CENTER (A) AT LEFT, OLD TYPE OF TURNBUCKLE; (B) AT RIGHT, BUTTERFLY TYPE OF TURNBUCKLE; AT RIGHT, BUTTERFLY TYPE OF TURNBUCKLE USED FOR REPLACING BROKEN LINKS IN SPROCKET CHAIN OF SWEEPER

the rolling stock and transportation departments' representatives and the several carhouses is required, and it is hoped that this plan will be successfully inaugurated on the Bay State system.

The above is signed by W. C. Bolt, investigating engineer, and approved by F. D. Ward, superintendent of rolling stock, and R. M. Sparks, transportation manager.

## Fare Boxes Help Speed Up Service

The Capital Traction Company and the Washington Railway & Electric Company of Washington, D. C., which have recently equipped several divisions of their lines with fare boxes, report that the number of fares turned in showed a decided increase after the installation, and continues to remain high. The traveling public has now become accustomed to this method of fare collection and this has had a considerable effect in speeding up the car service and obviating delays and long stops. No complaint has been made to either of the two companies in regard to the operation of the fare boxes and the passengers seem well satisfied with the innovation.

the ordinary type of turnbuckle, as the sides of this project out from the center line so that in turning it interferes with the surface of the chain.

A form of "butterfly" turnbuckle has been devised by the Brooklyn Rapid Transit Company, which overcomes this difficulty. The center part of the turnbuckle consists of a rectangular forging with a hook attached at the top. The hook for providing the adjustment and furnishing the tension is at the other end of this center portion, and is inclined at an angle so as to project through both the ends of the center portion of the turnbuckle. The extreme end of this hook is threaded and by the use of nuts the proper tension can be applied. This construction gives a straight pull on the hook which is furnishing the tension and also gives plenty of clearance between the lower part of the chain and the nuts for the use of a wrench to tighten them.

The accompanying illustrations show the method of applying this to a sprocket chain of a sweeper for renewing a broken link. Both the old type and the "butterfly" type of turnbuckles are illustrated.

This "butterfly" type of turnbuckle is also of service for connecting parts of the brake rigging, especially where there is a chain that must be pulled tight.



# Winding Coils for Old Armatures

**Additional Insulation Is Necessary at Corners and Between Leads Where Clearance with Core Is Small and Large Radius Bends Give Greater Flexibility for Rewinding**



FIG. 1—BUSY SCENE IN A COIL MANUFACTURING DEPARTMENT

**G**REATER precautions are necessary in winding coils for repairing armatures than when the coils are to be installed in new armature cores. These, cores, especially on the older type armatures, open up with service. This increases the length of the slots and so crowds the coils at the corners and ends. These are the points where short-circuits and grounds most frequently occur as vibration soon causes the cores to cut through the insulation at these points of small clearance. The laminations of the armature core are sometimes bent and sharp projections are formed from rubbing the pole faces; from wire bands loosening and becoming tangled about the armature, and from careless handling. In winding such armatures it is sometimes necessary to pull and distort the coils in order to get them into the slots. Where bends are sharp this pulling is liable to crack the tape and weaken the insulation at that point. These conditions as well as many others which result from operation must be met by

a satisfactory armature coil. In the belief that railway operating men would appreciate some pointers regarding armature coils from manufacturers the editors of this paper requested the proprietors of the Columbia Machine Works & Malleable Iron Company, Brooklyn, N. Y., to permit them to study the practices followed in their armature department. They did so and the present article is the result. The article should prove helpful to master mechanics who make their own coils as well as to those who buy their coils. There is still a great

demand for armature coils for what are usually considered as old motors, such as the G.E.-1000 and G.E.-800. Many improvements in the shape of the coils, the method of bringing out the end connections and provision for extra insulation at corners have been made in the later designs of motors that are not possible with the older types. A more substantial type of construction has also been used with most late designs while many of the older coils are frail and easily bent out of shape.



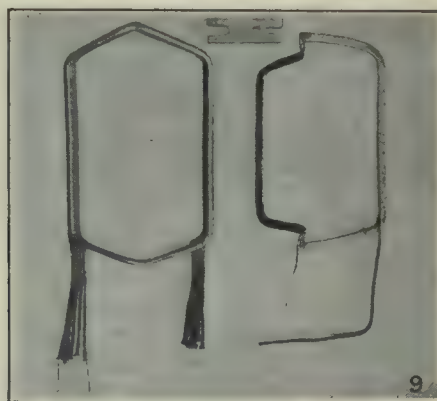
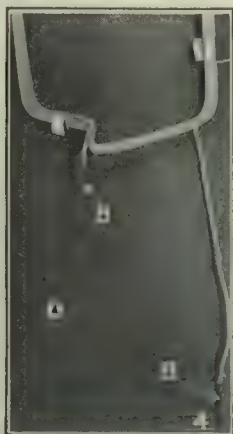
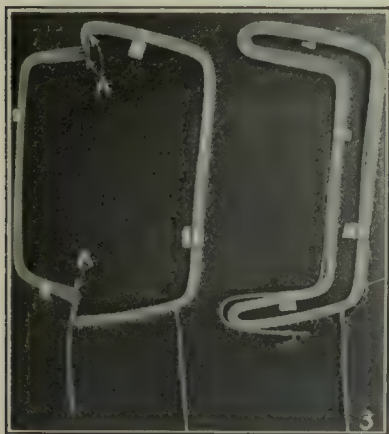
FIG. 2—WINDING COILS AND APPLYING INSULATION



Accompanying illustrations show several types of armature coils in various stages of manufacture in the Columbia works. After the coil is wound it is opened up and care is taken to see that the bends are not too sharp. While short bends make a coil of neat appearance they are difficult to insulate properly and the tape which is applied later to the two bends at the forward and back ends will crack if the armature winder has to spread the coils apart, as he most certainly will in winding. Furthermore, in order to get the coils into shape after spreading, the winder hits the bends with a mallet and when they are sharp the insulation is sure to be damaged. A coil with large radius bends is shown in Fig. 3.

It is necessary to flatten the ends of the leads on some types of coils to provide for connecting to the

order to hold these coils tightly together and prevent movement of one coil on another the fish paper is varnished. After assembling the coils are heated either in ovens or hot presses and the individual coils are pressed firmly together, and are kept in this position by the varnish. It is important that the varnish on the fish paper be not allowed to dry out as it then fails to hold the coils together. To avoid the drying out of this varnish it has been found best to varnish the fish paper in small lots which will be used within a few days after they are varnished. Experience at the Columbia works has shown that this varnish holds better if applied with a brush. On sheets which were dipped to provide the coating of varnish it was found that the varnish peeled off very readily, but when the varnish is applied with a brush it enters the pores of the paper



#### SEVERAL TYPES OF ARMATURE COILS IN DIFFERENT STAGES OF THEIR MANUFACTURE

Fig. 3—GE-1000 Armature Coil Immediately After Winding (Right) and When Opened Up (Left). "A"—Large Radius Bends.

Fig. 4—GE-1000 Armature Coil with Ends of Leads (B) Flattened and Tinned.

Fig. 5—GE-1000 Armature Coil (Left). "C"—Varnished Cambric Around Center Wire. "D"—Tape Where Lead Extends Over Coil. At Right, GE-58 Coils Assembled. "E"—Fish Paper Between Layers. "F"—Sleeving Extending Over Coil.

Fig. 6—Westinghouse 307 Coil with Sleevings Applied. "G"—Sides Double Wrapped with Varnished Cambric.

Fig. 7—GE-1000 Coil. "H"—Varnished Cambric Applied at Corner.

Fig. 8—Westinghouse 307 Coils. "I"—Bad Arrangement, Leads Bunched. "J"—Tape Between Leads.

Fig. 9—Westinghouse 307 and GE-1000 Coils Finished and Gaged Ready for Shipment.

commutator. This flattening tends to harden the copper at a point where flexibility is most desirable. The next step in the coil manufacture is to tin these ends. It has been found that by quenching the ends in cold water after they have been dipped in the hot solder the copper is softened. This affords an easy means for giving increased flexibility to these ends. Fig. 4 shows a GE-100 armature coil with ends of leads flattened and tinned.

When complete coils consist of two or more single coils they are assembled side by side. Fish paper, 0.010 in. thick, is placed between the coils in assembling. In

and holds firmly. Of course extreme care should be used in drying the sheets to make sure that no dirt or material which would be detrimental to the insulation gets on the varnish while the latter is soft.

Before the coils are taped with the linen tape a wrapping of varnished cambric is applied around the middle coil, at the corners, and as an additional precaution a figure-eight-shaped piece of varnished cambric is applied to the outside of the coil at the corners of the short side as shown in Fig. 7. The sides of the coil are also double-wrapped with varnished cambric. On the short side of the coil the bend comes right at the end



of the armature core and vibration soon wears this insulation. In taping the corners the tape is inserted between the leads where they emerge from the coil so as to provide against short-circuits and keep the leads securely in place (see Fig. 8). These leads should also be brought out so that all unnecessary bending in bringing them down to the commutator will be avoided and all sharp cross-overs done away with.

#### COILS SHOULD BE TESTED UNDER PRESSURE WHILE HOT

In applying the linen tape there will be some creases, wrinkles and rough spots that can only be pressed out in a hot press. The hot steam press will also square up the corners and make the coils tighter. Testing the coils for short-circuits and grounds is best made while they are hot and under pressure in the steam presses. The usual 500 to 600-volt railway circuit should be satisfactory for making these tests. Where hot presses are used these should be constructed and provided with connections so that cold water can be circulated through them for rapid cooling, and the coils should be kept under pressure till cold. If the coils are removed from the presses while hot they will round off in cooling and lose shape.

Small coils are sure to get out of shape during the different operations of their manufacture and an air press is needed to put them in shape again. After the coils are dipped, baked and gaged they are ready for installation in the armature. Where coils have to be shipped to their destination extreme care must be used in packing, otherwise they will be distorted and injured before they are used.

## How a Steel Stack Was Removed from Old Power Plant and Reinstalled in a New One

Method of Taking Down a Smokestack from a Power House Where It Was No Longer Required and Reinstalling It at a New Plant

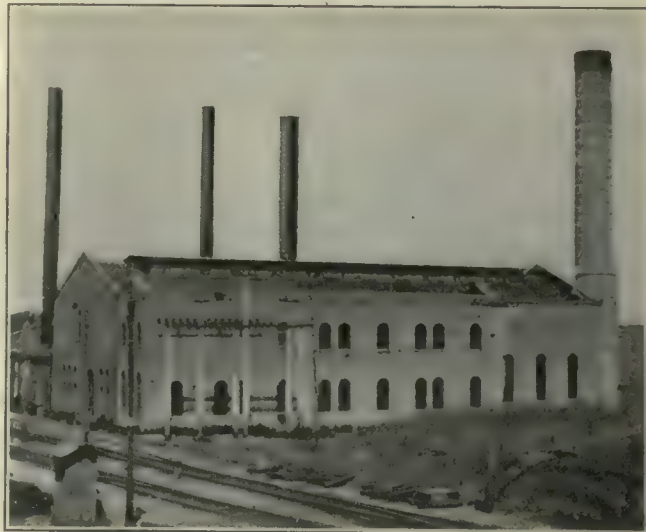
BY CLIFFORD A. ELLIOTT

Cost Engineer Maintenance of Way Department,  
Pacific Electric Railway

THE removal of a steel smokestack 7 ft. in diameter from the Vineyard power house of the Pacific Electric Railway and its reinstallation at a new power plant located at Torrance was decided upon as an economical measure. The boilers which this stack served at the Vineyard Station were no longer in service, and so the stack was not being used. It rested upon boilers 12 ft. high. Forty feet of the stack extended between the top of the boiler and the roof, while the remaining portion 55 ft. in length projected beyond the top of the roof.

Due to limited building space, the removal of this stack intact was not possible as it could not be lowered through the roof of the power house and be removed through the doors or windows of the building. A contractor was found, however, who was willing to undertake the removal of the stack in two sections. This was the method finally adopted. A large steel beam which extended through the roof as a part of the construction of the Vineyard power house offered a most favorable and substantial support for the installation of a gin pole and its rigging for handling the stack. A gin pole was installed and the hoisting line was run down through an opening in the roof to the boiler room and outside

the power house to a donkey engine. The section of the smokestack extending beyond the roof was first released and was lowered by the aid of the gin pole to the roof. It was then moved over the surface of the roof on rollers for a distance of approximately 40 ft. to the building line. The gin pole was then reset, and by its aid the stack was lowered over the side walls of the building to the adjoining power-house grounds, a height of approximately 50 ft. The second section of the stack, 40 ft. long, extending between the top of the boilers and the roof, was then lifted and placed on the roof, from which it was lowered to the ground in the same manner as the upper section had been handled. The total expense of



VINEYARD POWER HOUSE BEFORE STACK (THE LARGE STEEL ONE) WAS REMOVED

this removal and relocation of the stack will not exceed \$600 and will show a substantial saving over the cost of a new stack at the present high market prices. The distance between the two power houses is 20 miles and the stack was transported with auto trucks. The Torrance power house is at present about 35 per cent completed and when finished will serve the new power repair shops of this company. The stack when re-erected, will serve two 250-hp. Sterling boilers, which are also being transferred from the Vineyard power plant to the new power house.

### Cleaning Condenser Tubes

The *Electrical Engineer*, London, mentions a novel method of cleaning condenser tubes by blowing through them water with sand in suspension. Originally an air pistol was used to project the water, but subsequently sand was introduced by means of the circulating water, about 1½ cu.yd. being added to the water daily. After three weeks of this treatment, it is stated, the condition of the condenser was much improved. The size of the condenser is not stated.

### Advantages of A.C. Welding

Some of the advantages claimed for the use of alternating current for arc welding are the following:

Simplicity of apparatus: no motor-generator sets, resistance grids, contactors, exciters, etc., are required. Portability of apparatus. Low power consumption. Ease of operation. Constant heat of arc. Deeper penetration. Remote liability of "burning" the weld.



# Saving Motor Shells from the Scrap Heap by Welding

The Different Steps in the Thermit Method of Welding Motor Shells as Used by a Large Electric Railway System Are Described and Some Suggestions for Relining Crucibles and Keeping Welding Tools in Proper Repair Are Given

THE amount of welding repair work which electric railways are carrying out has increased rapidly during the past three years. Much of this has been caused by the difficulty experienced in obtaining proper repair parts. Also in many parts deferred maintenance has resulted in breakages and an increased opportunity for welding repair methods. Thus bad track conditions increase the duty on the car equipment, and excessive wear of various equipment parts causes additional stresses from shock and vibration. Crystallization is also caused by vibration, and additional strains then cause breakage. A striking example is furnished by the breakage of motor cases. Most of the breakages occur through the axle bearing bore at the gear end of the motor where one end of the gear case is supported. This throws additional duty on the casting at this point. Wear in the axle bearing, and between the bearing and housing, also allows the motor to be raised and dropped a distance equal to the amount of wear every time the car is started or stopped. This wear is continually increasing and becoming more dangerous. Sharp blows are thus delivered at a vital point in the casting. In late designs of motors the manufacturers have worked out a construction to withstand these blows, but in the older types breakage occurs.

The thermit process has been used extensively in the repair of motor cases, and the purpose of this article is to explain the procedure which has proved most satisfactory in this work.

## FIRST STEPS IN WELDING MOTOR SHELLS

Nearly all motor shells requiring welding have some part entirely broken off. Where cracks exist it is desirable to cut or break the pieces apart, as the contraction of the welded side of the repaired casting will produce shrinkage strains, which might be sufficient to cause fracture during cooling.

When the parts have been separated the metal along the line of the fracture should be cut out so that approximately 1 in. of space is provided between the parts to receive the thermit. There are two ways of doing this, the better and quicker being to employ a cutting



FIG. 1—MAKING A WELD WITH THERMIT

flame of gas or an electric arc. If necessary apparatus for this is not available a series of holes may be drilled along the line of fracture and all metal between the holes removed. In cutting this metal off it is best to cut from the longer piece so as to favor the shorter end. If the break runs diagonally, it is advisable when cutting out, to make the opening as nearly vertical as possible. If the cutting is done with a gas flame there will be a certain amount of oxidation left on the cut surface. This should be chipped off carefully and the metal parts cleaned of all dirt and grease as far back as the mold box will reach. This is essential as otherwise when the mold is rammed up and the heat applied for preheating, grease or other combustible material will burn out and leave a space between the mold and the frame through which the thermit will run out. After the parts have been properly cleaned they should be lined up and clamped to prevent movement, the use of a surface plate being recommended for this purpose. An accompanying illustration shows a motor shell lined up in this manner.

Where a surface plate is not available a solid foundation with rails for conveniently fastening the holding-down bolts will prove satisfactory. Where the break is through the axle bore, as shown in the illustration referred to, the welding can best be carried out with the shell laid on its finished surface. With the shell in this position the riser will come on the outside of the shell and can be readily cut off, and so reduce the machining to a minimum. In setting up the parts it is necessary to allow for the contraction of the thermit in cooling by setting the parts away from each other a distance of  $\frac{3}{8}$  in. per 1 in. of space greater than that desired in the finished shell.

With the frame ready to receive the wax pattern this is next shaped around and between the parts to be welded. Yellow wax is used for this and it should be warmed until it becomes plastic enough to work readily or melted and allowed to cool until it reaches the proper consistency. This is most readily accomplished by pouring the melted wax into a pail of water from which it may be taken with the hand and formed into the space intended to receive the thermit. In applying the wax

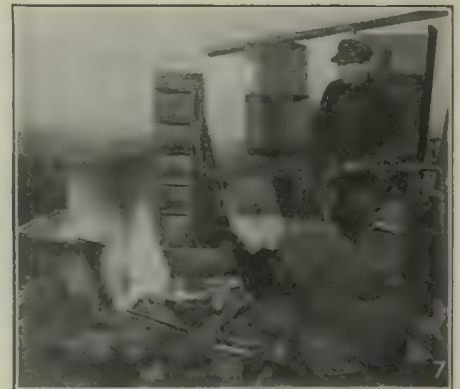
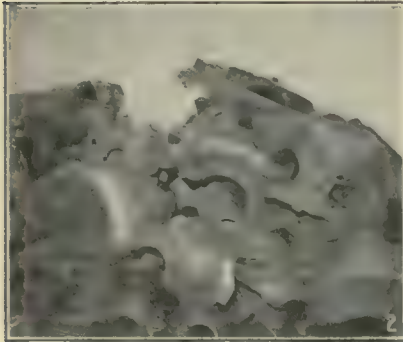


to a broken gear case lug of a motor frame it should be spread out so as to strengthen the parts when welded as much as possible. The bearing bore, which is usually found to be worn somewhat, should have a wax lining so that the thermit will fill in sufficiently to bring the bore to exact size when rebored.

The mold box should then be placed in position and supported so as to remove all weight from the frame. Mold boxes can be readily made up in the railway shops from sheet iron. A box  $\frac{1}{16}$  in. thick and 18 in. x 18 in. x 18 in. is a good size for welding motor shells. The bottom edges of this will need to be cut out to fit around the casting. In case the holes thus cut out should be

kept level and rammed hard. There should be a wall of molding material at least 4 in. thick between the wax pattern and the mold box at all points, as the thermit steel is intensely hot and ample molding material should be provided to hold it. The material underneath the casting can usually be rammed up more conveniently if the ramming is done before the mold box is put in position.

A preheating gate, a pouring gate and a riser should be provided in the mold. Wooden patterns should be used for these openings. The pattern for the heating gate should be about 3 in. in diameter at the outside end and tapered to  $1\frac{1}{2}$  in. at the inside. The pouring



#### PRELIMINARY WORK FOR MAKING MOTOR SHELL WELDS WITH THERMIT

Fig. 2—A Pile of Broken Motor Shells.

Fig. 3—Cutting Out Metal from the Fracture with Electric Arc.

Fig. 4—Broken Motor Shell Lined Up on Surface Plate.

Fig. 5—Wax Mold Applied to Break at Axle Bearing.

Fig. 6—Finishing the Mold and Removing the Riser Pattern.

Fig. 7—Preheating the Casting.

too large they can be closed with pieces of steel in such a manner as to retain the molding sand properly.

#### CONSTRUCTING THE MOLD

The facing of the mold, or the part that comes in contact with the thermit, should consist of equal parts of fire clay, crushed fire brick and fire sand. The manufacturers of thermit supply these materials where they cannot be readily obtained in the immediate vicinity of the railway. This mixture should be well riddled, mixed dry and then moistened with just enough water to make it pack well. It can be used for the entire mold where the welds to be made are small, but for welds of the size necessary on motor shells it is more economical to use it only for facing and to use loam or a mixture of one part fire clay to two parts of good sharp sand for backing. The facing should have a thickness of from 1 in. to  $1\frac{1}{2}$  in. all around the wax.

In ramming up the mold, 3 in. to 4 in. of molding material should be placed in the box and rammed with a small rammer first around the edges and working toward the center. The molding material should be

gate pattern should be about  $1\frac{1}{2}$  in. at the top and slope to 1 in. at the bottom. The riser may be rectangular and about 2 in. x  $3\frac{1}{2}$  in. at the top and tapered  $\frac{1}{2}$  in. in its length. The pattern for the preheating opening should be set at the lowest point of the wax pattern and should project outside the mold box. Where the sections to be welded are of the same size this preheating gate should be set in the middle of the lowest part of the wax pattern so that both sides of the casting may be heated equally. When the two sections to be welded are of different sizes the preheating opening should be set more to the side of the heavier section as this will require longer to heat than the lighter section.

The pattern for the pouring gate should be set directly above that for preheating and about 1 in. away from the wax pattern. This should also be set at an angle as indicated in an accompanying illustration.

The riser pattern should be placed at the highest point of the wax pattern. If there is more than one high point, a riser should be placed over each. The function of the riser is to hold a supply of steel which will remain liquid for a considerable time, to take care



of all shrinkage and to act as a depository for loose sand or other material which will be washed into the riser by the action of the thermit in passing through the mold.

After the mold has been rammed up, the top should be hollowed out to form a basin in which the slag can collect so as not to overrun the box. The mold should be vented by making holes with a No. 8 or No. 10 gage steel wire so that all gases in the liquid metal can escape readily. The patterns for the gate, riser and preheating opening can be readily withdrawn by rapping them slightly. A molder's slick, trowel and lifter are very useful for wiping away any loose sand that might

but higher pressures can be safely used, as the tank is tested to 250 lb. Valve *B* allows the compression air to flow into the top of the tank and places the gasoline or kerosene contained therein under pressure, driving it up through the pipe *C* into the needle valve *D*, which regulates the amount of fuel to be mixed with the compressed air which flows across the by-pass around the needle valve and through the check valve *F* into the hose and so on to the burner. Fuel and air become mixed together at the needle valve and also through the passage from *D* to the burner *G*. Valves *D* and *E* are used to regulate the torch, controlling the fuel and compressed air respectively.



#### FINISHING OPERATIONS AFTER WELDING REPAIRS HAVE BEEN MADE

Fig. 8—Crucible in Place Ready for Making the Weld.

Fig. 9—Cleaning Off Sand from Casting.

Fig. 10—Trimming Off Gates and Riser with Oxy-acetylene Torch.

Fig. 11—Casting Cleaned, Ready for Machining.

Fig. 12—Grinding Axle Bearing to Remove Rough Metal.

Fig. 13—Boring out the Axle Bearing in a Boring Machine.

fall into the mold. After the patterns are withdrawn the various openings should be covered and the crucible set up, with the bottom about 3 in. above and directly over the pouring gate.

#### PREHEATING IS ESSENTIAL

The parts to be welded must be brought up to a good, red, workable heat, and the mold should be dried out thoroughly. The Metal & Thermit Corporation has developed a preheater for this purpose which operates with compressed air and either gasoline or kerosene. Gasoline is recommended for fuel, as it gives a clean, hot flame, with no deposit of carbon. Cleanliness is essential to insure satisfactory results in welding, and even a small deposit of carbon may prevent complete fusion. This type of preheater is fitted with either one or two burners as desired, and the needle valve gives a close regulation of the mixture of air and fuel.

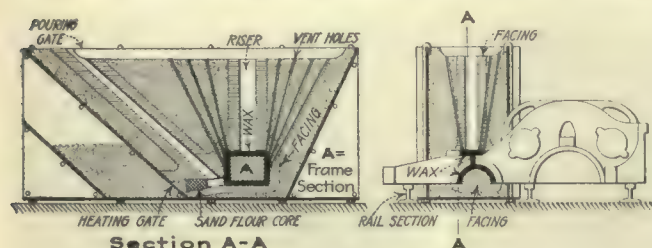
The preheater shown in the illustration on page 585 should be connected with the compressed air supply at *A*, which admits the air to a water separator. The air pressure used should be at least 50 lb. per square inch,

In starting the torch is placed in position in front of the preheating gate of the mold, but about 1 in. away. Oily waste, or a flame of some kind at the end of the burner pipe is used to keep the burner lighted until it is satisfactorily regulated. The air valve *B* is opened wide and then the air valve *E* is opened from one-half to one full turn, according to the air pressure used; and the gasoline valve *D* is opened one-half to three-quarters of a turn, the amount depending upon the air pressure. The burner will take a few minutes to start properly, because the mold is cold, tending to liquify the vapor. Gradually, as the preheating gate becomes hot, the flame becomes steady. The burner is lighted more easily if at first a slight excess of fuel is used. Unless the mold is intricate, so that a strong flame would tend to break it, the air flow can be increased after the flame is well started, and then the fuel increased correspondingly. Too much air will tend to extinguish the flame; too much fuel will produce a long, yellow and smoky flame. Shortly after the burner is started the wax will melt and burn out, coming from the riser in the form of a heavy white vapor. This may



be ignited at the top of the riser and pouring gates to eliminate the fumes. If the mixture is right there should be no flame at the end of the burner pipe when it is taken away from the mold. If there is a flame the air valve at the top of the gasoline valve should be opened wide.

After the wax has burned out, small sheet-iron plates should be placed over the riser and over the pouring gates to hold the heat in the mold. The plate over the riser should be left in place to cover the opening until after the weld is poured and to prevent any slag which may slop over from the crucible during the reaction from entering the riser openings and spoiling the welds.



DETAILS OF MOLD FOR WELDING MOTOR SHELL WITH THERMIT

At the end of the preheating, the burner is placed in the riser and in the pouring gates for a short time so that any loose sand may be blown out through the heating gates. In stopping the burner, the fuel valves *B* and *D* are turned off completely, but the air valve *E* is left turned on, or perhaps opened wider to blow all vapor out of the burner pipe. The water should be drained out of the water separator from time to time through the test cock at the bottom.

#### HOW THE CRUCIBLE IS PLUGGED AND CHARGED

While the preheating is in progress the crucible may be plugged and charged with thermit. To do this the opening at the bottom of the crucible is closed by first inserting a thimble wrapped with one thickness of uncreased paper. The tapping pin is then suspended through the thimble, and over this are placed an asbestos washer and metal disk. These are covered with refractory sand.

After the thermit crucible has been plugged, the charge of thermit may be added. It is important to put in a few handfuls first before dumping in the rest of the charge so as not to disturb the plugging material. The thermit charge should be mixed carefully before putting it in the crucible. No ignition powder should be added till the thermit charge is ready to be ignited.

When the preheating has been finished and all preparations made for pouring, the preheating opening should be plugged with a piece of fire brick ground to fit, or with an iron plug. The plug should be backed up with several shovelfuls of molding material between the mold box and a steel plate provided for the purpose. The sand should be packed down hard with a rammer. This will prevent the possibility of the thermit steel running out through the preheating opening. All heating apparatus should be removed a safe distance before the thermit is ignited.

To ignite the thermit, the contents of the ignition powder can be mixed and a half teaspoonful of the powder is placed on top of the thermit in the crucible. Thermit will not ignite from the heat of the preheater,

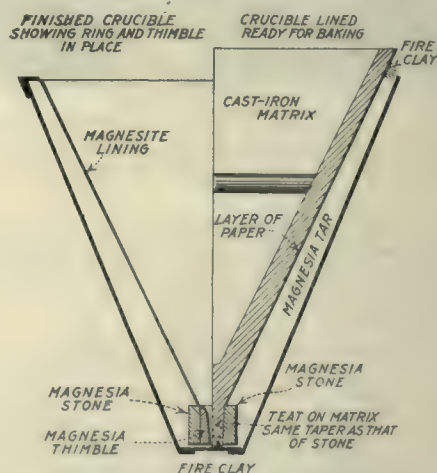
TABLE I. QUANTITY OF THERMIT FOR DIFFERENT SIZE WELDS

Width of Frame, Inches	Depth of Frame, Inches	Width of Thermit Steel Collar, Inches	Thickness of Thermit Steel Collar at Center, Inches	Quantity of Railroad Thermit Required for Weld, Pounds
3	2	4	1	40
3	2½	4	1	40
3	3	4	1	45
3	3½	4	1	50
3	4	4	1	55
4	4	4	1	65
4	4½	4	1	65
4	5	4	1	70
4	5½	5	1½	75
4	6	5	1½	75
4½	4½	5	1½	70
4½	5	5	1½	75
4½	5½	5	1½	75
4½	6	5	1½	80
5	5	5	1½	75
5	5½	5	1½	80
5	6	6	1½	85
5	7	6	1½	90
5½	5½	6	1½	85
5½	6	6	1½	90
5½	7	6	1½	110
6	6	6	1½	100
6	6½	6	1½	120
6	7	7	1½	130
6½	6½	7	1½	130
6½	7	7	1½	150
6½	8	7	1½	160
7	7	7	1½	155

Space cut out between frame ends should be the same as the thickness of the collar (see fourth column).

and the reaction cannot be started without ignition powder. This ignition powder can be ignited with a match, or with a red-hot iron. After the reaction has started, it is best to wait at least thirty-five seconds before tapping the crucible. This is accomplished by knocking up the tapping pin at the bottom of the crucible, using for this purpose a tapping spade or a piece of iron about 4 ft. long.

After the mold has been poured, it should be allowed to remain in place as long as possible, preferably overnight, so as to anneal the steel in the weld, and in no case should it be disturbed for at least three or four hours after pouring. Where a night shift is worked, it is found very convenient to do the pouring in the afternoon shortly before quitting time of the day force,



CONSTRUCTION OF CRUCIBLE FOR THERMIT WELDING

then the mold can be broken up by the night gang before they leave in the morning and all parts can be properly cleaned up.

Table I gives the amount of thermit required for different size welds. It is usually advisable, however, to calculate the amount of thermit necessary from the wax used. Care should be taken to have the entire space filled with wax, which later is to be filled with thermit steel, so that not only the collar, but the space between the frame ends are filled with wax. By weigh-



TABLE II—CAPACITY OF THE DIFFERENT SIZES OF CRUCIBLES

Size of Crucible	Capacity in Pounds of Railroad Thermit	Outside Diameter at Top, Inches	Height, Inches	Size of Magnesia Stone for Relining	Size of Magnesia Thimble or Fe Used	Size of Plugging Material to Fe Used	Weight of Magnesia Tar Required for Relining, Pounds	Gross Shipping Weight, Pounds
No. 1	6	8½	8½	No. 1	No. 1	No. 2	8	40
No. 2	8	10	10	No. 1	No. 1	No. 2	20½	60
No. 3	15	12½	13½	No. 2	No. 2	No. 2	42	110
No. 4	25	14½	15	No. 2	No. 2	No. 2	61½	125
No. 5	35	16½	15	No. 2	No. 2	No. 2	87	150
No. 6	70	20	21	No. 2	No. 2	No. 2	141	250
No. 7	140	25½	25	Nos. 1-2	No. 2	No. 2	216	450
No. 8	210	28	28	Nos. 1-2	No. 2	No. 2	258	525
No. 9	280	30½	29½	Nos. 1-3	No. 3	No. 3	327	650
No. 10	400	34	34	Nos. 1-3	No. 3	No. 3	408	775

ing the wax before and after the completion of this operation, the difference will be the quantity of wax used. For every pound of wax one bag of railroad thermit, which holds 25 lb., is allowed. This rule provides ample thermit steel, not only for the weld proper, but also for the pouring gate and riser. Where the welds to be made are small, it is necessary that extreme care be used in weighing the wax, otherwise a small error will make a considerable difference in the amount of thermit to be used.

#### AN AVERAGE MOTOR SHELL WELD COSTS \$30

In checking over the material used by one railway company in making a number of welds to broken gear case lugs on motor shells, it was found that an average weld takes about 2 lb. of wax or approximately 50 lb. of railroad thermit. Table II gives the different sizes of crucibles necessary for different quantities of thermit. It will be seen from this table that a No. 6 crucible has a capacity of 70 lb. of railroad thermit and is the size most suitable for most welds of motor cases. One man and a helper can make one weld a day. This includes cutting out the material for the thermit, cleaning the casting, setting up the mold and making the weld. The time taken for grinding and machining will be in addition to this. The total cost of making a weld to a gear case lug will average about \$10 for labor and about \$20 for material, making a total of \$30.

In comparing the time taken for making similar welds by the electric welding method, it was found that to weld a gear case lug electrically required about twelve hours as compared with eight hours for thermit. The cooling of the thermit welds takes from three to four hours additional, and there is more machining to be done where thermit is used, so the total time taken is about the same for the two processes. Railways which have had experience with both classes of welding state that the principal advantage of thermit over the electrical process is, that it does not take such a skilled operator to carry out the process, so that when a weld is completed they feel that there is less danger of the work proving unsatisfactory.

#### CRUCIBLE LINING IS AN IMPORTANT FACTOR

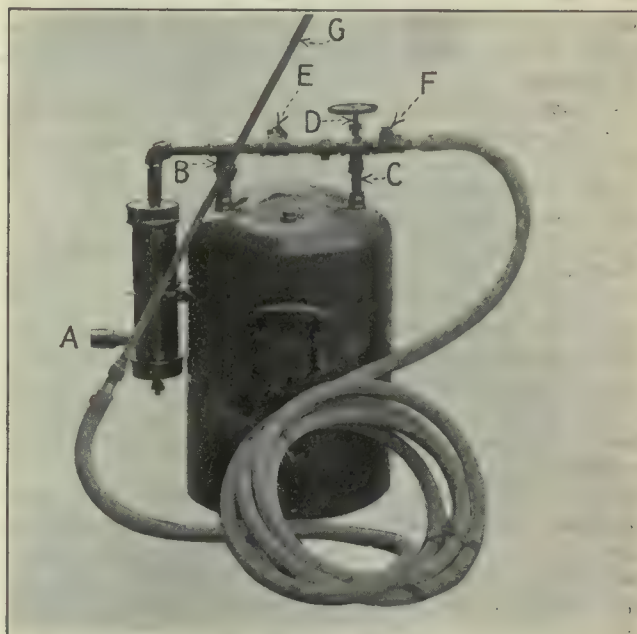
The crucible and the thimble through which the metal runs after the reaction are two of the important factors in the thermit process. The high temperature together with the ebullition of the molten metal during the reaction, necessitates a lining which is not only mechanically strong, but of a very highly refractory substance. It has been found that magnesite-lined crucibles are the only ones which satisfy these conditions. This material is furnished in the form of magnesia

tar. The tar acts as a binder for the magnesite and is burned out in the process of baking the lining.

In the usual operation required for welding motor shells, a crucible lining will stand about twelve reactions before it becomes so thin as to endanger the metal casing. Ordinarily the point at which it is necessary to have the crucible relined can be determined by watching for heating of the outside sheet iron. If a dull red spot should appear during the reaction, the crucible should not be used again until it is relined.

Crucibles should be handled very carefully as the lining is liable to crack and fall out under rough treatment. It is also always important that they be stored in a dry place, as the lining, being porous, will absorb moisture, and produce a violent thermit reaction.

A certain amount of slag will be found adhering to the inside of crucibles after they have been used. It is



SINGLE BURNER PREHEATING EQUIPMENT

not necessary to clean out this slag, as it is a very refractory material itself and can do nothing but help preserve the crucible if left on. At the bottom, however, in the vicinity of the stone and thimble, the slag must be removed so as to clear the opening of the thimble or permit the old thimble to be knocked out and a new one inserted. Very often it is possible to increase the life of crucibles by patching the linings with magnesia tar. This is particularly the case where they wear away in spots, or at the bottom. In the latter case, care should be taken to patch the lining at the bottom with magnesia tar so as to cover the stone. This magnesia tar should be thoroughly baked before the crucible is used. In some cases fire clay has been used for patching crucibles. This method is not recommended, however, and it will be found that if magnesia tar is used instead, it will stand up much better under the heat of the thermit reaction.

#### PREPARATION OF MATERIALS AND LINING OF CRUCIBLES

To line the sheet-iron shell of the crucible, the magnesia tar should be heated until it becomes plastic. A few handfuls should then be placed in the bottom of the crucible shell and a magnesia stone, as shown in an accompanying illustration, should be inserted in this



material and centered over the hole. More magnesia tar should then be rammed around the stone to hold it firmly in place. The cast-iron crucible cone should then be placed in position with the small projecting teat at the lower end set in the hole in the magnesia stone. The upper part can then be centered inside the shell by means of wedges inserted at equal distances along the circumference. The magnesia tar can then be rammed into the space between the cone and the shell a little at a time and tamped hard, for upon the density or hardness of the lining depends the life of the crucible. Special iron tools should be made up for this tamping and should have flat ends. Good hard blows should be struck with a hammer on the upper end of the tool when ramming, or what is better still, a pneumatic bench rammer can be used for this purpose. The material should be added a little at a time, as the better and more uniform the tamping the longer the crucible will last. As the mass nears the top the wooden wedges should be removed, as the lining already in place will hold the cone in position.

It is necessary to remove the cone before baking and to place a layer of wrapping paper or newspaper over the tar lining so as to prevent the sticking of the cone to the lining after baking. Before the cone is taken out, a mark should be made with a piece of chalk on the cone, and the point opposite it should be marked on the lining, so that when the cone is withdrawn it may be placed exactly as before. After the cone has been replaced, a crucible ring should be placed around the top and luted carefully with fire clay to protect the upper part of the lining from the heat while baking. It is also good practice to place damp fire clay around the bottom of the crucible and inside of the stone for the same purpose.

The baking of the lining is carried out in an oven. The heat should gradually be raised until the cast iron cone becomes red hot, and this temperature should be maintained until fumes stop rising from the tar, after which it can be allowed to cool gradually before removing from the oven. If the crucible is baked too long, the lining will appear crumbly and the life of the crucible will be very much shortened. Baking for too short a time will leave some of the tar in the lining and cause a violent thermit reaction. When cool, the luting may be removed and the cone taken out, when the crucible is ready for use.

#### WORN THIMBLES SHOULD BE REPLACED WITH NEW ONES

The portion that has to withstand the most severe strain of all is the part at the bottom of the crucible, or the walls of the hole through which the metal is tapped. It has to stand the wash and pressure of the moving liquid metal and slag under great heat. The magnesia stone, which is centered in the bottom of the crucible and around which the material for lining is packed, has a tapered hole in the center. The thimbles are of the same taper as the holes in the magnesia stone and are set into the latter as shown in the illustration on page 584, which gives the various details in the construction and lining of a crucible. When the thimble requires replacing either due to enlargement of the hole or to the thimble becoming split or cracked, it can be knocked out and replaced with a new one, so that the full life of the crucible may be utilized. The thimbles should be wrapped with one layer of uncreased paper before being placed in position.

## The Restoration of Truck Frames by Electric Welding

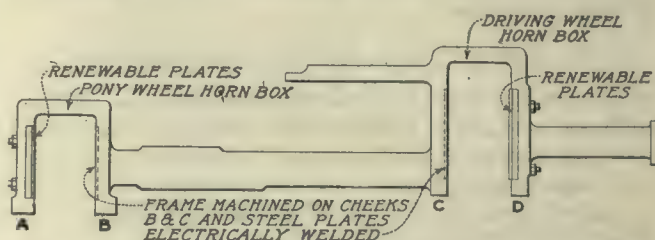
By J. M. CALDER (A.M.I.E.E.)

Chief Assistant Engineer Reading (Eng.) Corporation Tramways

**A**N AMERICAN critic recently observed that upon the conclusion of hostilities most of the rolling stock of street railways which had been in use for any lengthy period would be consigned to the scrap heap.

When an opportunity presents itself to this individual to witness some of the excellent repair work now being executed on rolling stock by the application of electric welding he may have reason to withdraw his somewhat bold statement.

The introduction of this method of restoring worn parts and so saving expensive renewals commends itself to the attention of engineers associated with the upkeep of all tramway material. To cover the whole repair ground work would be a somewhat comprehensive task, consequently the writer has chosen to deal with that part of the truck upon which much depends as regards the stability of the tramcar—notably, the side frame. As this class of work is so general in character, the side



SIDE FRAME OF BRILL MAXIMUM TRACTION TRUCK

frame of a Brill maximum-traction truck, which has just been under overhaul and repair, will be the subject of our consideration.

Prior to the stripping of the trucks for overhaul it was found that no satisfactory setting of the brakes could be effected because of the excessive clearance due to severe wear on the cheeks of the horn boxes of the side frames, and also on the cheeks of the journal boxes. Measurements of the journal boxes taken showed that the vertical sides which ride under the horn boxes were not parallel, consequently these were machined so as to make them parallel. This point is worthy of note, chiefly because the measurement of the horn boxes which are under repair are inter-dependent on the size of the respective journal boxes belonging to them. The journal boxes now being trued up, we turn our attention to the side frames. Measurements taken showed that the side wear varied from  $\frac{1}{4}$  in. to  $\frac{3}{8}$  in., chiefly on the cheeks marked "B" and "C" (see sketch). Temporary centers were placed on the horn boxes and vertical parallel lines were scribed on the face around the horn box, showing the depth of recess which would accommodate the steel plate about to be inserted, and so form a new working face. The frame was then "set up" in a shaping machine and the cheek machined to the line marked thereon.

When this was done the steel plate, suitably dimensioned, was carefully fitted to the recess. On the opposite cheek of this horn box is fitted a renewable cheek plate secured to the side frame by means of two bolts. To renew this plate (see "A" and "D" on sketch) it was necessary only to replace the same by a new one, in order to make good this side or cheek of the horn box. Upon bolting up the latter plate, the other one, which



is now ready to be welded on, was temporarily inserted in position, and held there by means of a steel rod of about  $\frac{3}{8}$  in. diameter, and about  $\frac{1}{8}$  in. longer than the actual gap of the horn box. This rod was used to fasten the loose plate in position, and so keep it in place ready for the electric welding operation. The simplicity of the latter operation needs no lengthy explanation. The supply voltage was about 50 to 100 volts and a current of about 120 amp. was taken. The electrode used for welding was composed of Swedish iron positive in polarity while the truck frame was connected to the negative side of the supply circuit. After the welding was finished the surplus metal around the newly-welded plate and frame was cleaned off. The horn box of the side frame had every appearance of being a sound job, likely to endure for many years to come the hard service wear which would probably be imposed.

Were it not possible to apply electric welding to the repair work of these frames the job would certainly be much more difficult and expensive. A glance at the sketch will reveal to any engineer the trouble likely to be experienced in setting up special drilling gear, if bolted instead of welded plates were to be fitted to the sides. The ordinary drilling tackle could not possibly be applied owing to the peculiar design of the frames. Furthermore, the depth of the metal to be drilled and other incidental work, such as specially fitted bolts, recesses to be machined, etc., all contribute to increased costs, which electric welding is likely to relieve.

## Machine for Testing Jacks Under Pressure

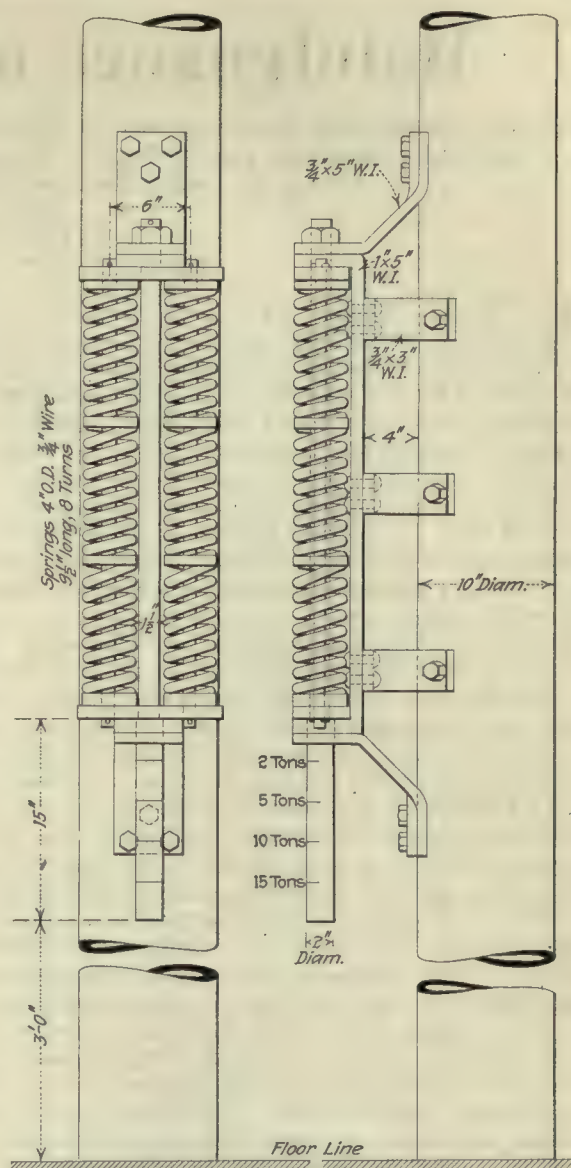
By E. R. PIKE

Assistant to Superintendent, Fifty-second Street Surface Repair Shop, Brooklyn Rapid Transit Company

THE device shown in the accompanying illustration was built for testing jacks after they had been repaired in the Fifty-Second Street surface repair shop of the Brooklyn Rapid Transit Company. It has proved very efficient and in addition to being very simple and inexpensive to build, there have been absolutely no maintenance charges of any kind for its upkeep since its installation a number of years ago.

The device consists of a forging or yoke long enough to permit the three coil springs, which were old springs removed from Brill 22E truck side bearings, to go in between when placed end to end. It will be seen from the accompanying illustration that there are six springs or two batteries of three springs each used in this construction. By this arrangement the necessary spring resistance was obtained without the necessity for placing all six springs end to end. This latter construction would have required a yoke twice the length of the one now in use. A piece of 2-in. round steel passes up between the two sets of springs. The upper portion of this rod is turned down to  $1\frac{1}{2}$  in. diameter and this forms a shoulder on which the plate rests that supports the springs at the bottom. Two pieces of  $1\frac{1}{2}$  in. round cold-rolled steel pass up through the center of the springs and through the collar on which the springs set, so as to keep them in central position. The yoke is riveted to three brackets which are in turn fastened to an iron column with a thrust forging at both top and bottom to relieve the shearing strain on the tap bolts used for fastening these brackets to the post. As no castings are used in making this device the labor and material cost are greatly decreased.

Before the device was placed in position and fast-



CONVENIENT MACHINE FOR TESTING CAR JACKS

ened to the column, it was taken to a hydraulic wheel press and calibrated. Indicating marks were put on the lower part of the push rod to correspond to the reading of the gage on the hydraulic press. Calibration marks of 2, 5, 10 and 15 tons will be seen in the accompanying illustration.

To test a jack, it is placed on the floor directly under the center of the push rod and then raised by working the jack handle. Either hydraulic or the automatic lowering types of trip jacks may be tested. The jack under test is raised until the push rod of the testing machine has been pushed up and the springs compressed to correspond to the capacity of the jack being tested.

With the above method of testing it is evident that the jack is subjected to practically the same strain as it would be were it being used in actual service and all possibility of failure is thereby eliminated. The method of supporting and installing such a testing machine can be varied to suit the condition where it is installed. It may be fastened either to the wall or to any other sufficiently strong part of the shop which will stand the strain. Any coil springs may also be used which are on hand and have sufficient capacity.



# Maintenance of Door Operators

The Writer Outlines the Methods Used for Operating and Controlling the Movement of Doors, Gives the Provisions Desirable for Emergency Operation and Describes the General Methods Used in the Inspection and Overhauling of Door Operators

BY GEORGE E. OAKLEY

Sales Engineer Consolidated Car-Heating Company, Albany, N. Y.

**P**NEUMATIC engines for the operation of doors of surface, elevated and subway cars are now considered as a necessary component of the car equipment. This is true of all new subway, elevated, center-entrance and one-man surface cars, and is rapidly approaching this condition in the case of the end entrance type of car, although I noticed in a recent issue of one of the trade papers that certain air-brake engineers class this part of the car equipment as "parasites." Pneumatic door operators are used for operating sliding doors, with and without folding steps, and folding doors with folding steps.

There are various methods used for controlling the operation of the doors, briefly described as follows: The door operator is provided with a main valve which in one position connects the closing cylinder of the operator with the air supply and the opening cylinder to exhaust, and in the other position of the valve the opening cylinder is connected with the air supply and the closing cylinder to exhaust. In some cases this valve also cuts off the air supply at the end of the piston travel and connects both cylinders to exhaust. This valve is of the rotary, slide, or pin-valve type and is mechanically, electrically or electro-pneumatically operated. When the main valve is mechanically controlled there is a system of levers connecting the valve with an operating staff located at the conductor's station to which is fitted a small immovable operating handle. In the case of electrically operated valves, the main valve is operated direct by solenoids which are energized by means of push buttons or switches so located as to be convenient for the conductor. The electro-pneumatic control is obtained by the use of an auxiliary set of electric valves, operated from push buttons. These valves are of the pin-valve type, and when the coil of one of the valves is energized by pushing one of the buttons, say the opening button, the valve is opened and this produces an unbalanced condition of air pressure between the two sides of a small piston, and the resulting movement of this small piston is communicated to the main valve, thus throwing the valve to the opening position. By pressing the closing button the other auxiliary valve is energized, which throws the main valve to the closing position. These methods of control are all satisfactory, the one to be used depending upon the conditions of service, operation and class of car.

In the case of sliding doors the general practice is to provide an operator for each door, but in some cases the door operator is located above the doors and one operator works two doors. For folding doors, one operator controls two two-leaf doors and the folding step and is located above the doors or underneath the car.

## TWO TYPES OF DOOR OPERATORS USED

There are two general types of door operators in use—the direct drive and the geared type. In the direct drive type the movement of the piston is communicated

direct to the door through levers or a connecting link. In the geared type, the movement of the piston is communicated to the door through a rack and pinion in the operator and an arm pinned to the pinion shaft.

The latter type drive is coming into more general use, as it can be installed to better advantage in cars of the cross-seat type. Also in geared type operators for sliding doors provision is made for automatically cutting off the air supply to the cylinders when the stroke of the piston is completed, so that there is no air pressure in the cylinders except while the door is in motion. This reduces to a minimum the consumption of air and prolongs considerably the life of the piston leathers. Although there is no air pressure in the cylinder to hold the door in the closed position, it is impossible to open the door by pushing against it, nor will it work open due to the vibration of the moving car, as the driving arm of the door operator travels down to a locked position when closing the door, and the only way to open the door is by means of an emergency handle keyed to the door operator shaft.

As a number of surface and subway cars have all the doors equipped with this type of door operator it is necessary to provide means whereby one door on each side of the car, in the case of surface cars, and one door on each side and the two body end doors, in the case of subway cars, may readily be opened from the outside in case the car is laid up in the yard with all doors closed. Where the doors are controlled by means of push buttons, provision is made for opening the doors from outside the car by providing special push buttons so constructed and located as not to be readily operated by passengers from the station platforms or the street. It is also desirable to provide some means for opening these doors by hand from the outside of the car in case certain switches inside the car should be open, thus cutting off the current supply to the push buttons or should there be no air on the car. Thus in addition to having the external push buttons a mechanical device is provided by means of which the driving arm of the door operator can be raised to a height sufficient to allow the door to be pushed open by hand.

## PROVISION FOR EMERGENCY OPERATION OF DOORS IS ESSENTIAL

It is always possible to open the doors from inside the car in case the current supply or air, or both, should fail, but in some instances public service commissions have requested that provision be made in connection with the door equipment of surface cars for easily and quickly accomplishing this by the conductor or the passengers in case of accident and resultant excitement. Hence in some installations when the direct drive door operator is used there is a disconnecting device for each door, so arranged that by pulling a handle located in a convenient place the door is disconnected from the door operator and is then easily pushed open by hand. Another method of accomplishing the same result, and



which is probably more satisfactory as it is less complicated and requires very little maintenance, is to arrange the emergency opening device so that the pulling of the emergency handle will throw the door valve to the opening position. Then if there is any air on the car the door will immediately open; if there is no air, the door can easily be pushed open by hand. When the cars are equipped with the geared-type machine which cuts off the air at the end of the stroke, the emergency opening device is so arranged that by pulling the emergency handle the driving arm of the door operator is raised up high enough to allow the doors to be pushed open by hand.

Two other special features in connection with door operator installations are the collapsible shoe as applied by the Interborough Rapid Transit Company to the front edge of the doors of subway cars and the collapsible driving arm of door operators used by the New York Municipal Railway and the Long Island Railroad. With the collapsible shoe equipment, in case the door when closing strikes a passenger the movement of the door is reversed and the door then travels in the opening direction until the obstructing pressure on the shoe is removed, when the movement of the door is again automatically reversed and the door goes on to the closed position. With the collapsible driving arm, which is for the purpose of guarding against passengers getting caught and held by the door when it closes, it is possible to push the door open about 4 in. from the fully closed position, which is sufficient to allow a person to free his arm or foot if caught by the closing door. When the pressure against the door is released, the compression springs of the collapsible driving arm return the door to the fully closed position.

#### EASY ACCESS TO ALL PARTS REDUCES MAINTENANCE COSTS

In taking up the question of maintenance of pneumatic door operators it might be well to first consider the question of installation at the time the cars are built, as the nature of the installation will to a large extent affect the service obtained and the maintenance required. The railroad engineers, car builders and manufacturers should work together with the object in view of obtaining an installation which will provide for maximum ease of access to all parts of the apparatus, consistent, of course, with the essential features of the particular car design. If the equipment is so installed that it is difficult or unhandy for the shopmen to inspect or work on the apparatus, it simply means that the equipment is going to be slighted and not given the proper attention; or, in case the shopmen and foremen are conscientious and do their work properly irrespective of time and trouble required, it means that the cost of maintenance will be excessive—two results which are absolutely unnecessary. It is not to be inferred from these remarks that pneumatic door operators require an unnecessary amount of attention, but any part of the car equipment having moving parts requires more or less attention and should be inspected regularly, and the door operators are really an important part of the equipment. Not only should the question of accessibility be considered when making the original layout, but also ample clearance should be allowed for the doors and any moving external part of the operators. It is quite essential that these points be kept in mind when details of the installation are being worked up,

in order that the best results be obtained from the pneumatic door operators.

The basis of inspection and overhauling should be the same as for the control and air-brake equipment, whether this be time or mileage. The mileage basis, when the mileage is accurately kept, is undoubtedly the more equitable, but in any case there is no reason for a separate basis of inspection for the pneumatic door operators.

#### ATTENTION NECESSARY ON INSPECTION

In inspecting this part of the car equipment, the doors should first be operated to see whether or not they operate properly and at the required speed. If the operation of the doors is all right, the door slides, driving arm, levers or connecting links and door hangers should then be examined to see that there are no loose screws, pins or bolts, and that there are no excessively worn parts; the door slides and door sheaves should be given a little oil if necessary, and the valves should be inspected to see that they are not leaking. In the case of some of the older type equipments with a rotary valve not attached to the engine body, these valves should be oiled on inspection. I will not attempt to state what to do in case the doors do not operate properly, as the shopmen soon learn where to look for the trouble from the manner in which the doors behave. It is quite essential that the doors, door hangers and tracks be maintained in good condition, and that the doors work freely, as any trouble here will seriously affect the operation of the door equipment. Where collapsible shoes or disconnecting devices are used, they should be tried out and their various parts carefully inspected.

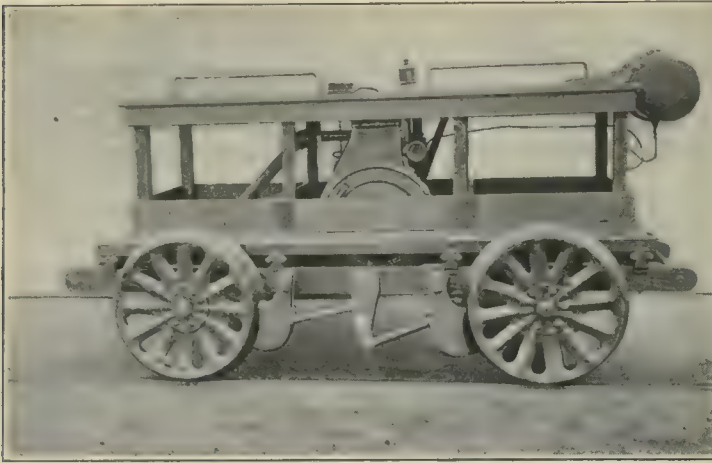
The older types of door operators should be overhauled once a year, while the later types, the construction of which permits of the piston leathers and other moving parts being kept in better condition due to improved lubrication facilities, can easily be placed on the same overhauling basis as for the car.

#### OPERATORS SHOULD BE REMOVED FROM CAR FOR OVERHAULING

The door operators should be removed from the car, taken to the overhauling bench and completely taken apart and the various parts thoroughly cleaned. The piston leathers should be removed and new leathers (a supply of which should be kept in oil of the same kind as used in the door operator) installed. The leathers which are removed should be examined and those found to be in good condition saved, as these leathers can be used to replace leathers which might become defective between overhauling dates. The various parts of the operator should be carefully examined and those parts replaced, the condition of which would indicate that they might cause defective door operation before the next overhauling date. The valve parts and ports should be thoroughly cleaned and valves ground in or renewed where found necessary. The overhauling bench should be equipped with air connections so that the door operators after being assembled may be tested out in order to make certain before putting the operators back in the car that they work properly and that there are no leaks.

While the door operators are being overhauled on the bench, the doors, hangers, levers, etc., should be gone over and put in good condition; the air pipes blown out and the air strainers removed and cleaned.





MOTOR SIDE OF CAR SHOWING SECTION REMOVABLE FOR CRANKING PURPOSES



CONTROL SIDE OF CAR SHOWING BRAKE LEVER ON OUTSIDE AND CLUTCH LEVER INSIDE

## Interurban Motor Section Cars

**Detroit United Railway Is Equipping Interurban Divisions with Section Cars—Built to Obtain Low-Speed Feature for Safety**

THERE is little need to emphasize the value of motor section cars for an interurban road of any considerable mileage. The energy of the men that is saved for their more necessary work and that for which they are primarily employed will more than pay for the cars in a short period. Instead of reaching the job fagged out and ready for a rest they arrive full of "pep" after an exhilarating ride in the morning air. In addition, due to the labor shortage of the last few years, it has been almost impossible to get section men to pump the old style hand car. And then there is another point which generally carries considerable weight, and that is the matter of time consumed in getting to the job. The Detroit United Railway, which operates some 584 miles of interurban lines, claims that the case of an electric line differs from that of a steam line and that speed is not the only point to consider.

John Kerwin, superintendent of tracks, places more value on the safety of his men than he does on a little time saved, and he does not believe that they should travel over the road in a section car at 30 m.p.h. It is his opinion that even on steam roads at the present time safety is sacrificed for speed much more than is necessary. Consequently, much investigating and experimenting have been done, and failing to find a car that entirely filled the requirements laid down the De-

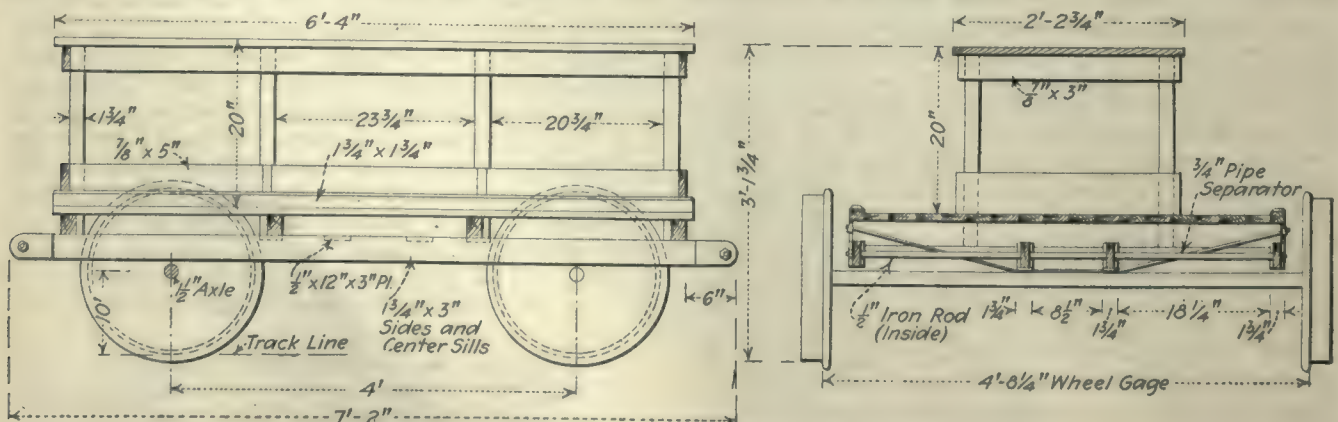
troit United Railway is building its own motor section cars.

The general design of the car bodies is as shown in the accompanying drawings, the wooden members being oak throughout. The wheels are standard 20-in. steel wheels and are purchased from an outside source. The motor used on this car is a New Way, one-cylinder, 4-horsepower, 4-cycle engine with clutch control and one-way one-speed operation. The engine is air cooled, equipped with Holly carburetor and Bosch magneto, and the flywheel travels at a speed of 800 r.p.m.

The car is chain driven from a sprocket on the rear axle with a gear reduction of four to one, there being sixty teeth on the axle sprocket and fifteen teeth on the motor sprocket. The motor sprocket is made in the track department shops and is keyed onto the axle. The resultant speed ranges from 5 to 12 m.p.h.

The motor weighs about 250 lb., and the car complete weighs 450 to 500 lb. This makes it possible for two men to handle the car with comparative ease and four men can lift it bodily. There is a total seating capacity for eight men. The car is braked on all four wheels by means of a hand lever the brakes being wood blocks lined with strips of leather belting.

At the present time there are five cars which have been in operation for several months, and more will be built from time to time as necessary. The cars make 20 miles to the gallon of gasoline, giving an estimated total operating cost of approximately 1½ cents per mile. The total cost of the machine is about \$250, of which \$125 is for the motor.



END AND SIDE ELEVATIONS OF MOTOR SECTION CARS BUILT AT DETROIT



# Conditions Govern the Choice of Rail Bonds

Several Common Types of Rail Bonds Are Discussed  
and Their Adaptation to Conditions Is Pointed Out

By G. H. McKELWAY

Engineer of Distribution, Brooklyn Rapid Transit System

**T**HE first bonds used to connect track rails were of iron wire and were riveted into the web of the rail. These very much resembled the bonds now used for the track circuits controlling signals, except that the material differed. When it was found that greater conductance than that afforded by iron wire was desirable, a change was made to copper and the cross-section of the conductor was increased until solid bonds of No. 0000 capacity are now common. There is very little danger of a heavy solid bond being broken by the movement and vibration of the rails, as is the case when strands or ribbons are used for the conductors. On account of the stiffness of solid bonds, however, they act as levers which tend to loosen the bond terminals as the rails move. Therefore, while the conductor itself is not so liable to be damaged as when made in

below the line of the track bolts there will be a somewhat larger opening, with a smaller one above the bolts. When this condition occurs it can be met by the use of "unbalanced" branches in the conductor, that is, one of the branches will be of smaller cross-section than the other, although the total cross-section of both of the branches will equal the section desired for the bond. Often the openings are rectangular rather than square and the distance above and below the bolt holes are greater than that between the web of the rail and the joint plate. In such a case the round stranded wire is not suitable and a rectangular form must be found that will pass through the rectangular holes. Then, instead of making up the conductors from round wires, they are formed from flat ribbons of copper, these ribbons being approximately  $\frac{1}{32}$  in. thick and generally about

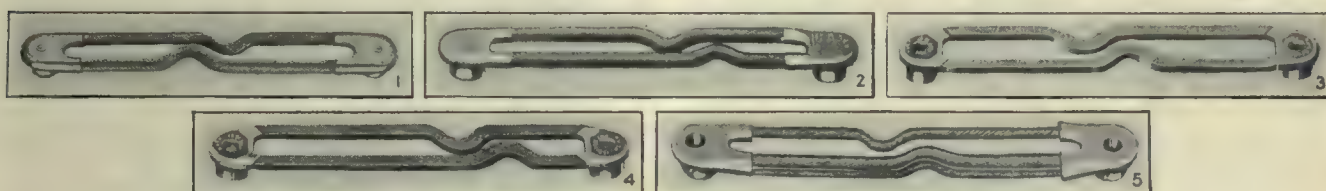


FIG. 1—TYPE F-3-T BOND; FIG. 2—TYPE C. S.,—04 CROWN BOND; FIG. 3—TYPE U. P.,—01 UNITED STATES BOND; FIG. 4—TYPE U. P.,—04 UNITED STATES BOND; FIG. 5—CROWN TRIPLEX RAIL BOND

another form, the bond as a whole is less efficient because of its weakness at the terminals.

In order to avoid this lever-like action a more flexible conductor was needed and stranded wire was naturally made use of. This is much more satisfactory and does away entirely with the twisting action on the terminals. At the same time, if the bond is properly designed and made and if the individual strands are of sufficient length and of proper cross-section there is but little chance of their becoming broken. It is no fault of the stranded bond that it is not used universally. In some forms, it costs more than other bonds similar in length and conductivity but the principal drawback to its use is due to the poor design of the joint plates with which so many rails are equipped. This trouble does not appear when the bonds are used outside of the plates but it becomes serious when space must be found for the bonds between the plates and the rails.

The most common size of bond is No. 0000. A stranded bond of that size requires a space at least  $\frac{1}{2}$  in. square to pass through, and in order to avoid pinching still more room is really needed. There are few joints made with such a large clearance so that the most obvious step is to make a bond with two conductors connecting its terminals. If both of the conductors are of the same size then for a No. 0000 bond the size of each of the conductors will be No. 0 and the opening needed by each one can be reduced to  $\frac{1}{8}$  in. x  $\frac{1}{8}$  in. With many joints even this requirement is too great and two openings of that size cannot be found, although often

$\frac{1}{8}$  in. wide. Sometimes ribbons are of nearly double that width and on other occasions they are hardly half as wide. The number of ribbons in the branches varies with the size of the bond and these are usually from one and a half to two times as many on the lower branch as in the upper.

There is still another type of bond conductor used under the plates where the clearances are limited. This is a stranded two-branch bond but, instead of leaving the conductor round, it is squeezed into the shape shown in one of the illustrations and it then takes up no more room than a ribbon bond. The most recent development is known as the "triplex" bond and consists of three branches, a fairly large conductor passing above the line of bolt holes and one large and one small wire running through the opening beneath the bolts. This last-named bond has not been on the market long enough to have had a thorough try-out, but it requires less room than a stranded bond with only two branches and should have a longer life than the stranded type which has been squeezed out of its round shape.

With the comparatively short bonds used under the plates there would not be sufficient flexibility if the strands or ribbons ran practically straight from one terminal to the other, and so they are looped or "crimped" or "tucked," as it is variously called, as near the center of the bond as circumstances will allow. These loops add greatly to the life of the bonds, especially when placed in the center, and the resistance to the effects of vibration lessens very materially as the tuck



approaches the end of the conductor. Where only one bond is used to a joint the crimp can be placed at the center, between the two end bolts of the rails, but when two bonds are used they have to be placed as shown in the illustration, with the terminal of one bond, as well as the track bolt, passing between the two branches of the conductor. This makes center tucking impossible and forces the loop to be made close to one of the bond terminals. With bonds having thin ribbons or strands of wire a well-made crimp will increase the life of the bond by almost 100 per cent.

When two bonds are used at a single joint and on opposite sides of the web of the rail it is the general custom to drill the hole for one terminal of each bond between the first and second bolt holes from the end of the rail, and the other holes between the second and third bolt holes from the end of the other rail. The diameters of the single strands of wire bonds vary from 0.04 in. to 0.08 in. The smaller size is much preferable, as experience has shown that they have almost twice the life of those with strands of twice that diameter.

It might be thought that the protected bond that would be considered as best for all round work would be either of the ribbon type or of the type with formed strands, and the ordinary round bond would be last in favor, as the two former can be used in all places that the latter can and in some places where it cannot be used. This, however, is not the fact and the round wire bond is to be preferred for all places where it can be used because it will be found to have a longer life than either of the other two types. Some persons claim that the ribbon bond is even stronger than the wire type for withstanding the effects of movement in a vertical direction, and though they admit that against horizontal vibration the ribbons are not as strong as the wire strands, yet they claim that there is so very little horizontal movement to the rails that the weakness does not show up in practice. The writer has found in actual practice, that the wires last much better than the ribbons and there are places where the use of comparatively short concealed bonds is necessary as ribbon bonds would last but a very short time.

### New Colloidal Fuel Developed

UNDER the auspices of the Submarine Defense Association, which consists of shipping and allied interests, a committee of engineers has been at work for some time developing a fuel which would consist essentially of a mixture of fuel oil and powdered coal. The primary purpose in developing the new fuel was to reduce the consumption of fuel oil.

The association now authorizes the statement that it is possible to suspend permanently in oil 30 per cent to 40 per cent of coal pulverized so that about 95 per cent passes through a 200-mesh screen, the suspension being assisted by a special fixateur. It is now possible to combine in a stable liquid fuel about 45 per cent oil, 20 per cent tar and 35 per cent pulverized coal, thereby replacing more than one-half the oil, securing equal or greater heat values per barrel and saving considerable cost.

As an example of this fuel, the statement is made that "industrial colloidal grade No. 10," devised to use up some poor coal holding 25½ per cent ash, is composed of 61½ per cent of pressure-still oil, wax tailings, petroleum pitch and fixateur, running 18,505 B.t.u. per pound, and

38½ per cent of anthracite rice running 10,900 B.t.u. This grade contains 162,500 B.t.u. per gallon and has 10.2 per cent of ash. The fixated oil itself has 151,750 B.t.u. per gallon. In fuel value, therefore, the colloidal fuel is worth 7½ per cent more per gallon than the oil from which it is made.

### Scribing Rail Surfaces to Show Wear

THE instrument shown in the accompanying illustration was developed by the Metal & Thermit Corporation for making records of rail joint wear. To obtain a chart of the running surface of a rail the instrument is placed firmly in position on the part of the running surface of the rail to be scribed, with the supporting foot extending out in the back. A hardened roller running on the surface of the rail



RAIL SURFACE INDICATOR FOR RECORDING WEAR OF RAILS

head imparts motion to a pencil point as the rider moves from one end of the instrument to the other. This transfers very accurately a pencil record onto a strip of paper clamped into the stationary part of the machine. The leverages of the rider are so arranged that a pencil point placed on one side will make an exact duplication of the unevenness of the rail head, whereas if placed on the other side the ordinates of this unevenness will be multiplied by three, thus enabling a more accurate examination of the defects. The scribed records can be carefully marked and filed away for future reference and by comparing them with similar records taken subsequently the rail wear is indicated. The instrument is referred to as a "rail surface indicator" and records made from it year after year and superimposed will quickly indicate any defects which eventually would result in joint trouble or corrugations.

Joint defects such as mentioned above in the case of thermit welds are found to be due in every case to very minor initial defects in the grinding of the rail joint originally, these minor defects being aggravated by the constant hammering of the wheels. An original record of the joint, therefore, made by this machine enables the engineers of the company carefully to watch the joints in the order of their installation and correct any such minor defects in the grinding which may have escaped the operator's notice.

The American Zinc Institute, in its campaign to increase the uses of zinc, is advocating spelter for rail bonding purposes. It is reported that a very important electric railway has recently purchased a large quantity of this metal for the purpose. The institute points out that zinc is a comparatively plentiful and cheap metal, and in many directions is satisfactorily taking the place of more expensive materials.



# Some Mysterious Car Ailments

Little but Important Troubles That Tend to Keep Equipment Men Interested in Their Work

CONTRIBUTIONS ARE INVITED FROM THE FIELD



## A Peculiar Case of Controller Trouble

THE freight business of a large electric railway property required the use of an additional electric locomotive. This was built in the shops of the company and the equipment used was of an old type made up of spare pieces which the railway already had on hand. To avoid the necessity of purchasing a new four-motor controller two old K-13 controllers were installed and placed back to back. A large rack with the necessary gearing to provide for operating the controllers in unison was mounted on the tops.

After completion a test run was attempted but in shutting off the controller it blew up. The motors were tested and the wiring was checked for wrong connections but all were found correct. Another attempt to run was made, but with more disastrous results as this time the entire cab of the locomotive was badly burned. This led to a further investigation. It had been noticed that in shutting off the controller the arc from the contacts held on instead of being cut off sharply as was to be expected. Further tests showed that the controllers had no blow-out effect due to the magnetism from the coils being opposed so as to neutralize the blow-out effect. The leads to one of the blowout coils were then reversed and no further trouble was experienced.

## Train Stalls on Crossover and Ties Up Line

AN ELEVATED TRAIN equipped with multiple-unit battery-type control started to pull out of a yard preparatory to going into service. The head car had just reached the main line while the others were taking the crossover, when the train stalled. This was just at the height of the rush hour, and several other trains were in the yard ready to go into service, while others, heavily loaded with passengers, were tied up on the main line due to the position of the stalled train. The train dispatcher "started hopping around" at a lively rate and called to all employees in sight to try and get the train off the line. A rapid inspection showed all equipment in apparently good working order. An inspector boarded the rear car and found that the equipment would operate all right from the master controller on this car. The train was again pulled back into the yard by operating from the rear end so as to clear the line, and a thorough inspection was given all parts of the equipment.

The trouble was eventually located as an open circuit in the battery "plus" train-line wire between the master controller and the switch group. On opening up the junction box immediately underneath the master controller a loose connection was found. Evidently when last repairs had been made in this junction box, the nuts on the battery plus binding post had not been tightened down securely. These had loosened somewhat and the loose connection resulted.

## A Train That Operated Satisfactorily Outbound But Was Very Sluggish on the Return Trip

ON AN IMPORTANT railway system using multiple-unit battery-type control, with train-line jumpers between cars, the motorman of one of the trains reported it as operating O. K. while west bound but as being very slow on the east-bound trip. As the east-bound part of the trip occurred during the rush hour when passenger traffic was very heavy, this resulted in a considerable delay. On arrival of the train at the terminal the electrician, after a very rapid examination, finally located the trouble as a defective jumper between two of the cars. The train was composed of six cars and the defective jumper was between the last two cars on the west-bound trip, but was between the first two cars on the east-bound trip. A further inspection of the defective jumper showed that the multiple wire was open. This caused all cars back of the defective jumper to operate in series only so that on the west-bound trip five of the cars were operating in multiple and one in series, while on the east-bound trip one car was operating in multiple and the other cars in series. This explained the difference in operation in the two directions.

Troubles of this nature have been one of the greatest sources of annoyance to railways using train operation since the introduction of multiple-unit-type control. Such troubles are caused principally by the breaking of the small wires at the terminals in the jumper heads, or in the body of the jumpers where they are subjected to the greatest bending action. Various means have been tried to detect the broken wires, such as connecting all the wires of the jumper in series through a bank of lamps or by subjecting each wire in the jumper to abnormal current, so that in case a wire is partly broken, the high current passing through this would burn it apart. At the same time that these tests are



conducted, the jumper is usually twisted and bent so that the tests may be made as severe as possible. Tests of this nature are usually made monthly and they necessitate considerable handling of the jumpers. The labor involved in collecting these jumpers for test is very expensive.

One road has instituted a method of testing and inspecting each jumper every time the train containing that jumper is in the shop for inspection. The test consists of operating the control equipment on each car of the train, from the master controller on the end car. At the same time an inspector checks each car to make certain that the controller equipment of that car is operating satisfactorily, and at the same time additional inspectors move the cable of each jumper up and down so that by this action a broken connection will be detected by the dropping off of the controllers back of the open circuit. Since the institution of this method of testing, a large number of defective jumpers have been located, and much trouble and inconvenience has been avoided.

### A Multiple-Unit Control Equipment That Would Not Notch Up

A VERY serious detention occurred on an elevated line using train operation, with cars equipped with automatic battery-type control. The motorman of the train reported that the control would take one or two notches and then immediately drop off, so that he could scarcely get the train over the line. The cars were taken out of service and inspected for open circuits and dirt on the control contacts, but nothing to account for the erratic operation was found. On taking voltage readings of the batteries, it was discovered that all were weak and one set was badly grounded. As all the batteries in the train were connected in parallel, the grounding of this set had caused the other batteries in the train to attempt to charge it, so that their voltage had also been reduced. This grounding had occurred through the wood battery boxes, due to corroding of the terminals, and to acid-soaked boxes. To prevent a recurrence of the trouble, batteries were removed as rapidly as possible, and the boxes were soaked in concentrated soda solution for twenty-four hours, after which they were painted with an acid-proof paint. Porcelain insulators were also installed underneath the boxes and between them. This gave a better circulation of air, as well as providing an efficient insulation.

### A Car That Would Not Leave the Terminal

AFTER changing ends at a terminal, the motorman of a certain car equipped with multiple-unit control found that he could not start it. An electrician was called, and on opening up the switch group and reverser he found the latter thrown for operation in the reverse direction and it would not operate from the master controller on the front end of the car. He at first thought that a poor contact in this master controller might be the cause of the trouble, but all contact fingers were found to be working properly. The electrician then went to the other master controller to see if the equipment would operate from that end and found that the contact drum of this master controller had not returned entirely to the "off" position, so that contact was still being made for the reverser circuit. The reason for the

failure of the drum to return properly was found to be a broken return spring. To assist in preventing spring breakages the manufacturer changed the shape somewhat so as to do away with a sharp bend and greater care was given to selecting spring material.

### Solving a Hot Axle Bearing Mystery

THE number of hot axle bearings on a large railway system became excessive, expensive and annoying. There were two motors per car of 200 hp. each, and these were mounted on one truck. At first it was thought that improper or insufficient lubrication was the cause of the trouble. The heating of the bearings charred the waste and destroyed all evidence as to the quantity of oil in the bearings at the time the overheating started. On comparison of the records showing the time that the cars had received oil, and the quantities used, it appeared that a sufficient quantity had been added to take care of the service requirements. As no leaks were found in the housings it was evident that the oil could not all have been used up in the short time that the cars were in service between the time that the bearings were inspected and the time that the hot bearings occurred.

In addition to this investigation of lubrication, the bearings were also carefully gaged for clearance, and a microscopic inspection was made of the bearing surface. These tests showed that a pitting action, electrolytic in its nature, had taken place in the bearings, which was evidently caused by the return current from the motor finding an easy path through the bearings to ground. Milli-voltmeter tests were made, which proved that the current passing through the bearings was of a quantity sufficient to heat the babbitt lining and partially melt it. To overcome this trouble a ground lead was installed between the motor frame and the truck bolster to give a low resistance circuit for the current. Since this installation the company has been free from troubles of this nature.

The success derived from the above investigation prompted the officials of the road to conduct similar experimental work in connection with armature bearings. A brush collector was installed on one end of the armature shaft to relieve it from carrying current which might be caused by leakage or grounds. This particular armature has now been in service for about three years without trouble.

There has always been a sort of controversy between the shop men responsible for the maintenance of armatures, and foremen of the electrical repair departments as to the fundamental cause of armatures damaged by rubbing the pole faces. Where hot armature bearings occur and the motors are continued in service for a sufficient length of time, the clearance for the armature is decreased and rubbing occurs. The electrical repair foreman thus draws the conclusion that the damage to the armature results from hot bearings. On the other hand, the repairman usually produces evidence showing that oil in sufficient quantity and at sufficiently frequent intervals has been added to take care of normal conditions, and these men maintain that the grounding or short-circuiting of armature coils was the original cause of the trouble, and that the hot bearings resulted from this, rather than being the cause of the trouble. The test and investigation above referred to were conducted to settle this controversy.



## What Makes a Good Trolley Hanger?

The Author Considers the Practical Features Which Experience Shows to Be Necessary in a Durable Insulator

BY G. H. BOLUS

Designing Engineer The Ohio Brass Company, Mansfield, Ohio

THERE are three general types of insulated trolley hangers in use in the United States for supporting direct-suspended trolley wire. They are the "round top," so called because the top of the hanger is of dome or round shape, the "West End" or insulated-bolt type, and the "cap-and-cone" type. Of the three the West End was the first in use and it still continues to be very popular, although the round-top type may be considered as gaining in popularity as indicated by the sales records of one of the largest manufacturers.

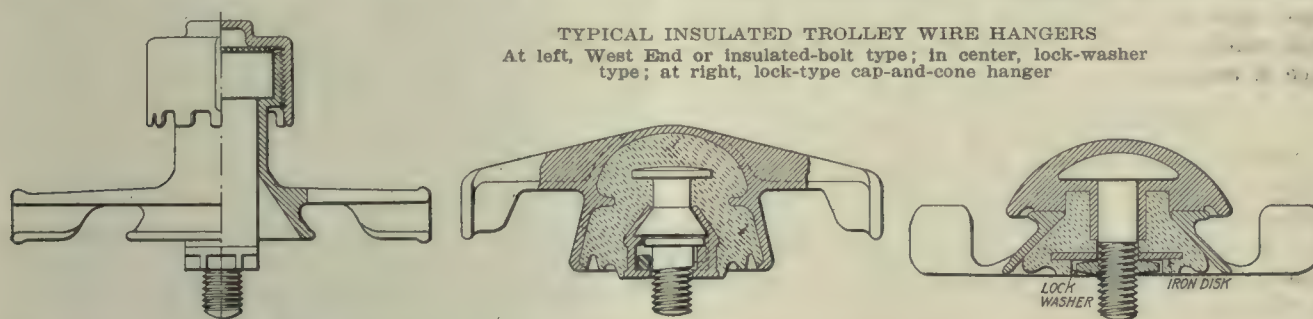
The West End, or insulated-bolt type, is illustrated in an accompanying drawing. It has the advantage that the insulated portion can be renewed without scrapping the malleable body and cap. In some localities where insulation goes to pieces quickly, due to atmospheric conditions, this factor results in preference being given to this type of hanger. For new construction the round-

tion to this hanger is the exposure of the insulation to the elements, but many large properties use it with entire satisfaction. Where trouble is experienced with this type hanger backing out of the ear-boss threads, a hanger of the lock type should be used. This is made with a metal bearing and positive lock washer which locks the parts together against accidental disengagement. A third illustration shows the lock-type cap-and-cone hanger.

### MECHANICAL AND DIELECTRIC STRENGTHS OF INSULATORS

Electrically all makes of hangers will test about the same. The writer has found that the round-top type will usually flash over from stud to shell at about 13,000 to 14,000 volts effective, and that the mechanical strength is about 4½ to 5 tons vertical load, at which load the stud is pulled from the body of the hanger. The West End type of hangers, except where bakelite insulation is used, will test about the same mechanically and about 9,000 to 10,000 volts effective electrically.

There are several characteristics which an insulation for trolley hangers should possess, namely, heat resistance, non-absorption of moisture, dielectric strength



TYPICAL INSULATED TROLLEY WIRE HANGERS  
At left, West End or insulated-bolt type; in center, lock-washer type; at right, lock-type cap-and-cone hanger

top hanger, in which the insulation is molded into a malleable-iron body and is not renewable, is the more generally used.

The West End hanger has the further advantage that as the bolt is rotatably mounted in the hanger body it can be screwed tightly in the boss of the trolley ear, thus preventing the stripping of threads both on the stud of the hanger and in the ear boss due to vibration. It is not so well adapted for curve work although it has been used to some extent in this manner. Its chief drawback for curve construction is the very heavy bending moment which is imposed upon the bolt at the point where it emerges from the body of the hanger.

While the insulation in the round-top hanger is not renewable this type of hanger will prove much better on a curve than the West End type. Until a comparatively recent date the principal objection to the round-top hanger was that it could not be lined up with the direction of the trolley and still provide a tight joint between the ear boss and the hanger seat. To overcome this defect several types of hangers have been evolved. The lock-washer type, shown in a second illustration, has met with great success.

The cap-and-cone type hanger is made in the standard and lock-stud types. This type of hanger admits of ready standardization, and the American Electric Railway Association has set standards for dimensions and contour which all manufacturers of overhead with one or two exceptions have adopted. The principal objec-

tion and mechanical strength. By various combinations of gums and fibers the manufacturer can produce stocks running high in one or two of these characteristics, but the aim should be to produce a balanced stock. In other words, a stock should not possess extremely high dielectric strength at the expense of mechanical strength or *vice versa*. The writer has in mind one molded stock which will show an extremely high dielectric strength when dry, but when the hangers have been soaked twenty-four hours in water and wiped dry, and are then tested, the stock is practically valueless.

Most trolley construction for 650 volts direct current employs series insulation; in other words, the hangers are in series with some form of span insulator. This is a step in the right direction because where no secondary insulation is used an arc may hold over from stud to shell, burning up the insulator and tying up traffic.

### RUST-PROOFING OF STUD IS ESSENTIAL

Overhead trolley hanger bodies are invariably of malleable iron, and some form of rust proofing is employed, ranging from electro galvanizing which is now practically obsolete, to hot dip galvanizing and sherardizing. The writer believes the sherardizing to be the most popular, as this process does not harden the malleable iron as does the hot-dip galvanizing process for instance.

Rust proofing of the stud, or of that portion which is molded in the insulation, should absolutely be insisted



upon because if plain iron studs are used, with the possible exception of Armco iron, oxide of iron is formed. This has a wedging action on the composition insulation and soon causes a separation of the stock from the stud, allowing the entrance of moisture and inviting early failure of the hanger electrically.

The question of petticoats versus a single groove in the insulator is a much discussed one and it is the writer's experience that either type will give satisfaction. The petticoats are added to lengthen the leakage path and in some cases to increase the resistance to side strain, but as there is a large factor of safety possessed by any of the trolley hangers on the market it is questionable whether any form of petticoating is necessary. An argument advanced for the single groove is that it is more easily cleaned than the multi-grooved construction.

Some manufacturers turn the span wire lugs on the arms upward while others turn them downward. With the upturned span lugs the strength of the design lies in the strength of the lugs, while with the down-turned construction the strength lies in the arm and its stiffened rib. The writer's preference is for the latter construction. He has personally installed both types on tight span wire and can see no difference in the ease with which one type is installed as against the other type of construction.

#### EXTRA-HEAVY STUD IS UNNECESSARY

All hangers in commercial use today are either  $\frac{3}{4}$ -in.-11 or  $\frac{1}{2}$ -in.-10 U. S. standard threading. On some properties where  $\frac{1}{2}$ -in. studs are used it is believed that this size is absolutely necessary for strength. The writer believes that  $\frac{3}{4}$ -in. studs will answer all requirements regardless of the type of construction or severity of the service.

There is now a movement under way, fostered by the government, to eliminate  $\frac{1}{2}$ -in. studs and ears entirely. This is done as a conservation measure and it is the writer's understanding that several of the largest manufacturers will not list  $\frac{1}{2}$ -in. material in their 1919 catalogs.

The practice of painting the bodies of insulated hangers with black asphaltum or other heavy black paint, applied after the hangers are installed, is a very good one. The paint protects the galvanizing of the hanger and, if well daubed about the span wire where it passes under the hanger lugs, will serve to protect the wire at this point where most span wires rust out from weather conditions.

The professional and special section of the United States Employment Service, formerly located at 29 South LaSalle Street, Chicago, has moved to 63 East Adams Street. This section was formerly known as the Division of Engineering but has enlarged its service to include all kinds of professional and technical men and women. Now that the war is over its activities will be directed toward reconstruction and peace needs. No charge will be made for its services. Registration blanks can be secured from the Employment Service, and applicants from Illinois, Indiana, Iowa and surrounding territory should register with the Chicago office of the section.

## Light-Weight Air Fender for One-Man Car

By F. P. MAIZE

Master Mechanic Portland Railway, Light & Power Company, Portland, Ore.

ALL cars provided with air brakes except those with M. C. B. drawheads, running in Portland, must be equipped with an automatic air fender which can be dropped by the motorman, or by a projecting trip in front of the fender which will automatically drop the fender and apply the brakes. As the present fender used by the Portland Railway, Light & Power Company is too heavy for the Birney cars, this company designed a fender eliminating all castings, bolts and threaded pipe, by using instead electric welded pipe and forgings. By so doing the weight of the fender was reduced 50 lb.

The fender as shown in the accompanying picture is composed mostly of pipe. The frame of the apron is made of  $\frac{1}{2}$ -in. pipe in one piece, bent cold in a form and electrically welded at the joint. Four pieces of  $\frac{1}{2}$ -in. pipe are welded on the top for holding the screen and bracing the apron. Clips of  $\frac{1}{2}$ -in. round iron are welded



SAFETY CAR WITH LIGHT-WEIGHT AIR FENDER

on the top for the projecting trip to work through. This eliminates all holes through the frame and makes it stronger and stiffer than the original fender. The joint in the back is made of two pieces of boiler plate electrically welded together. The uprights are made of light boiler tubing, one fastened to the body and the other to the apron. A chain running from the crossbar to an air cylinder under the car pulls the fender to the tracks.

The valve for operating the fender is a three-port slide valve operated by a piston. One port connects to the emergency line, one to the air cylinder and one to atmosphere. Main reservoir pressure is thus provided in the main body of the valve and the piston is held closed by a spiral spring. There is a  $\frac{1}{16}$ -in. hole in the piston, so that the air pressure can equalize on both sides. On the back of the piston there is a small needle valve, which when opened will reduce the pressure on the back of the piston so that the reservoir pressure will immediately force the piston over, thus connecting the emergency line with the exhaust and main reservoir pressure with the fender cylinder. When the needle valve is closed, the air pressure will build up through the  $\frac{1}{16}$ -in. opening and the spring will shove the valve



closed, connecting the fender cylinder with the atmosphere and closing the emergency line.

All pipe connections are made to a bracket, so that it is only necessary to loosen two bolts to remove the fender valve. As all parts are electrically welded, the fender, although much lighter, is stronger and more easily repaired than the older type.

## Timber Preservation Will Aid In Lowering Maintenance Costs

BY R. C. CRAM

Assistant Engineer Department of Way and Structures,  
Brooklyn Rapid Transit System

THERE can no longer be any doubt as to the fact that timber preservation should be considered as one of the most available means of reducing maintenance costs of ties, bridge timbers, poles and cross-arms. Electric railways use vast quantities of timber in these forms, and it is a well-known fact that renewals of tie timber alone represent the largest single item of cost in open track maintenance, if the general item of maintenance labor be excepted. With the rapid rise in costs of both timber and labor, it has become almost imperative that all available steps be taken to secure the greatest possible life from the timber.

The most important step in this direction, and the one which produces the greatest results, is that of giving the timber some preservative treatment. But the cost of treatment has also risen, and the most effective method in general, of preserving timber, which is creosoting, has become almost prohibitive because of the high cost due to greatly decreased supply caused by war conditions. This will continue for some time.

There are various methods of treatment, broadly grouped under pressure and non-pressure processes. Of the pressure treatments the best known and most generally used is the "full-cell" pressure treatment with creosote (Bethell process). Second in importance is the Burnett process of pressure treatment, using zinc-chloride. Various modifications of these two pressure processes have been employed, of which those still in considerable use are the Wellhouse or zinc-tannin process; the Card, or zinc-creosote process, and the several modifications of the "saving" or "empty cell" process. The last named includes the Lowry and Rueping processes.

Under the non-pressure method of treatment are the brush, spray, dip and open-tank processes. Each having its own modifications incidental to use and preservative employed. Industrially speaking, the open-tank process merits the most attention, since with variations of temperature and duration of the hot and cold baths almost any kind of preservative treatment desired, may be given with an absorption sufficient for most purposes.

There are various chemicals or preservatives employed in all of the foregoing general processes and creosote and various coal-tar derivatives represent by far the larger group. Under war conditions zinc chloride has come to be used quite extensively. The use of bi-chloride of mercury (Kyanizing) has been restricted to practically one section of the country for treating spruce lumber. Unfortunately the war has prevented much progress in the use of sodium fluoride solutions which

have proved very efficient abroad for a period covering the last two decades. The use of these salts is likely to increase, since tests so far made in this country bear out the promising results obtained abroad in that they are considerably more effective than zinc chloride. Crude oils have been tried as preservatives by the steam roads with very poor results and, at least, one electric railway has definitely proved that such treatments are a failure.

There appears to be some doubt as to the advisability of using zinc chloride on electric railways for tie treatments, because certain tests and statements have indicated that it has a destructive action upon spikes, tie plates and rail bases in tracks carrying electric currents. Signal systems have also been affected to some extent, but in nearly all cases we believe such troubles have been traced to the use of freshly treated ties, and it is reasonable to assume that if a proper seasoning period after treatment were allowed this trouble should be greatly minimized if not entirely eliminated. It is rather unfortunate that these doubts have arisen, since the zinc chloride treatment is comparatively cheap and increases the life of ties from two to three times that of untreated timber. There is little information as to similar action with the so-called double process using zinc chloride and creosote, but it may be assumed that the double process is to be preferred since the use of the creosote oil tends to hold the zinc chloride within the timber, thereby reducing the hygroscopic character of the treated timber. It is possible also that sodium fluoride, which is less hygroscopic, in combination with creosote oil may give a tie treatment with nearly equal preservative qualities as compared with a fuel-cell creosoted tie and at a much lower cost.

The large companies which purchase treated timber in the open market and the few whose requirements are sufficient to warrant the installation of pressure-treating equipments must be considered separately from the majority of companies which purchase timber locally and in comparatively small quantities. For this large class of electric railways, thorough open-tank treatment with any one of a number of desirable preservatives is available. The open-tank method is comparatively low in cost and its use in the past has been principally confined to treating poles, posts and bridge timbers, although quite a number of electric railways have open-tank plants for treating ties.

An extended tie life as well as the increased life of all timber is very desirable and can be obtained by this method without the installation of an expensive plant, at a cost which should be well under any of the pressure methods referred to. It will be well worth while for electric railway managements to investigate the subject thoroughly. Since most electric roads are being forced to use ties made from so-called inferior woods which require treatment if full life is to be obtained and which are usually delivered along their lines, the open tank method can be made available at almost all chief delivery points, thus minimizing handling and transportation charges to far-away treating plants. One of the principal reasons for the comparatively low cost of open tank treatments lies in the reduction or absence of these two items of expense.



# How the Public Service Railway Established and Will Collect Its Zone Fare

The Company Proposes to Put a Ticket-Issuing Machine on the Front Platform by Which Each Passenger Will Receive a Check Indicating the Zone in Which He Boards the Car — Then He Pays the Appropriate Fare as He Leaves by the Rear Platform

**I**N THE ABSTRACT of the proposed zone system of the Public Service Railway published last week the statement was made that the company considers its stand-by and readiness-to-serve cost as 4 cents per passenger and its movement expense as 1 cent a mile. These figures are backed up by detailed figures of the past and anticipated cost of operation.

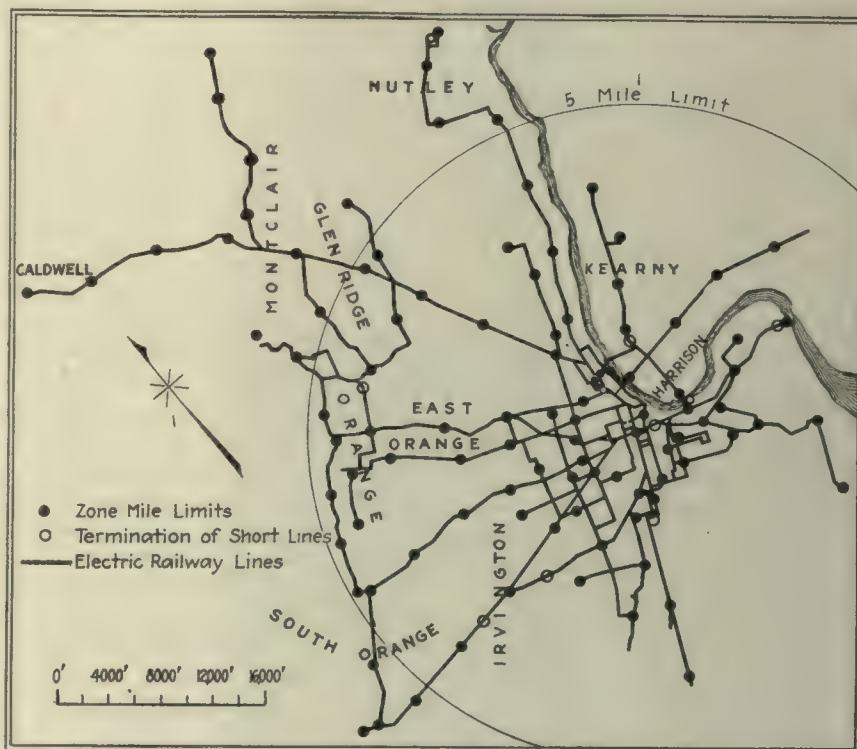
## ELEMENTS IN COST OF SERVICE

In discussing this question the company points out that the cost of service properly embraces all of the elements of expense required to enable the company properly to perform its natural functions, and these include:

- (a) The furnishing of good service to the public;
- (b) The maintenance of its property in proper repair and a reasonable allowance for depreciation; and
- (c) The securing of a return sufficient to attract capital to the enterprise.

The provision of good service to the public is, of course, the first and primary function of an electric railway and, therefore, the most important of the three factors summarized above as controlling the amount of revenues necessary to meet the cost of service. However, important as the first factor is, the company cannot accomplish this essential purpose unless the other two requirements are also met in a thoroughly satisfactory measure, for in the final analysis the furnishing of good service implies that the company must keep its facilities in a well-maintained condition, and that it must also, by reason of a stable net earning power, be kept in a position at all times to meet reasonable demands involving the investment of new capital.

Entirely aside from the capital requirements to meet increasing traffic demands, there is another very serious factor affecting investment which is not appreciated by the general public. An electric railway company has a peculiarly intimate relation to the development of the territory in which it operates, and because of this it must constantly meet requirements for the investment of new capital if it is to keep pace with the continuous and healthy growth of the communities which it serves. This is particularly true in the case of the Public Service Railway, located in that portion of the State of New Jersey where the industrial development has made marvelous strides in the last few years. This



MAP OF ESSEX DIVISION OF PUBLIC SERVICE RAILWAY, SHOWING PROPOSED ZONE-MILE LIMITS

industrial expansion will undoubtedly continue in the future as the great possibilities of this territory are more fully realized, and it is essential that the electric railway should be in a position to meet the demands which have accompanied and which must continue to attend such large developments.

In this widespread civic and industrial growth there must, necessarily, be constantly involved highway and street improvements, which, in locations where electric railway tracks are laid, usually necessitate participation by the railway company. Sometimes these improvements are undertaken by the cities in advance of the expiration of the full life of the track involved and the company is thus required to assume, in addition to such new capital as may be necessary, the replacement of its original investment long before the material has rendered its full and complete usefulness. To the extent, therefore, to which the renewal of such facilities is anticipated, the company is required to shoulder the loss of the value of the unused life and absorb the sum into its operating expenses.

Still another unusual demand which is frequently met is the matter of the relocation of tracks which must be undertaken by the railway company if civic or county improvements are to be carried out as planned



TABLE I—OPERATING EXPENSES—CENTS PER CAR-MILE, PUBLIC SERVICE RAILWAY

	Actual, 1914	Actual, 1915	Actual, 1916	Actual, 1917	Actual, 1918	*Actual Estimate 3 Mos. Year Ending Jan. 31, 1919	Ending June 30, 1920
Way and structures...	2.169	1.959	1.686	2.239	2.477	2.918	2.742
Equipment.....	1.707	1.650	1.770	2.047	2.989	3.840	3.603
Depreciation.....	0.924	1.191	1.344	0.316	0.626	1.458	2.000
Power.....	2.897	2.657	2.753	4.005	4.102	4.179	4.159
Operation of cars.....	7.678	7.477	7.947	8.372	11.042	13.059	12.960
Traffic.....	0.005	0.002	0.010	0.002	0.006	.....	0.004
General and miscel- laneous.....	0.912	0.911	0.981	0.944	1.167	1.266	1.223
Undistributed.....	1.638	1.414	1.569	1.674	2.148	2.430	2.283
Taxes.....	2.308	2.350	2.314	2.771	2.952	2.960	4.473
Total.....	20.238	19.611	20.374	22.370	27.509	32.090	33.447

\*Operating expenses and taxes actual; depreciation shown on basis of \$800,000. per year.

TABLE II—SCALE OF WAGES FOR TRAINMEN, IN CENTS PER HOUR, PUBLIC SERVICE RAILWAY

	In Effect 1-1-12	In Effect 1-1-14	In Effect 7-1-16	In Effect 10-1-17	In Effect 6-1-18	In Effect 6-6-18	Labor Board Award In Effect 6-7-18
First year—							
First six months.....	23	23	25	28	30	30	1st 3 Mos., 41
Second six months.....	23	24	25	28	30	35	Next 9 mos., 43
Second year.....	24	25	27	29	31	35	45
Third year.....	25	26	28	30	32	35	45
Fourth year.....	25	26	28	30	32	35	45
Fifth year.....	25	27	29	31	33	35	45
Sixth year.....	25	27	29	31	33	40	45
Seventh year.....	25	28	30	32	34	40	45
Eighth year.....	25	28	30	32	34	40	45
Ninth year.....	25	29	31	33	35	40	45
Tenth year.....	25	29	31	33	35	40	45
After ten years.....	25	30	32	34	36	40	45

by the authorities. This may mean the transfer of the tracks from the side to the center of the roadway or there may be involved in the contemplated improvement a substantial change in grade, or both. In either case, of course, heavy expense which is chargeable against operating cost must be assumed and substantial capital investment is made necessary to cover paving costs and other incidental new work.

That the expense entailed in such work as is referred to above is far from a negligible quantity is evidenced by the fact that over a period of years it has been necessary for the Public Service Railway to reconstruct with the same rail on an average 17 miles of track per annum, such work being undertaken in advance of the time when the track would have required replacement because of actual wear. At the average cost prevailing in 1918, the amount of money expended in the reconstruction of 17 miles of track would be approximately \$516,000, which burden the company has assumed annually in this one class of expenditures.

From 1913 to 1917 inclusive, the capital expenditures of the company for track, cars, buildings, etc., amounted to \$2,173,888.66 per annum as against an average increase in revenue for the same period of \$735,154.13, the ratio of added capital to increased revenue being, therefore, \$2.96 for each \$1 of added receipts. If the zone-mile system suggested by the company becomes effective, there will be required, in addition to the above normal investment, a capital investment for new registering machines, fare indicators, ticket-issuing devices for the new system of collection, and zone limit signs, as well as moneys for changes in car construction, which involve alterations in the entrance and exit doors and in platform arrangements. The total cash investment which it is estimated will be required to meet the above is approximately \$655,000.

#### OPERATING EXPENSES

The company also presented tables of operating expenses, the figures for the last five years on a car-mile basis and the wages paid since Jan. 1, 1912, being shown in Tables I and II. Table III shows the weighted average price of materials purchased in 1918 and prices paid in 1919. In this connection the company points out that in the conduct of the equipment and other departments it is necessary to contract for materials, such as wheels, gears, pinions, rails, etc., well in advance of the time when the articles will be actually used, in order to insure a sufficient and permanent stock and to obtain also the advantage of purchasing in large quantities. Fortunately for this company, many contracts of this character were made in earlier years and covered the war period, and, to that extent, the costs of operation in 1918 were reduced. These contracts have

now expired, and the company is forced to pay the higher rates now prevailing. Inasmuch as contracts and orders must anticipate the use of the articles needed for a considerable period, it is obvious that if reductions do occur, immediate advantage cannot be taken of the changes. In other words, the use of the lower-priced goods, if any recession of prices is experienced, would be deferred until the stock purchased at the higher rates has been exhausted. Because of this, there is no justification for anticipating for the immediate future material reductions below the costs which maintained in 1918 and which often involved a lower price under contracts than can now be secured.

The views of a number of expert economists are then published indicating that no early decline in commodity prices is to be expected. Among those quoted were the Federal Reserve Bank and prominent bankers and banks in New York.

From these facts, the company deduces the proper fare to be 5 cents for the first zone and 1 cent for each additional mile zone, as described in the portion of the report abstracted in the last issue of this paper.

#### COLLECTION PROBLEM UNDER ZONE-MILE SYSTEM

The great obstacle to the successful operation of a zone system has been the difficulty of collecting and accounting for fares. Several methods have hereto-

TABLE III—COMPARISON OF UNIT COSTS OF MATERIAL 1918 AND 1919

Item	Unit	1918 Weighted Average Price	Prices Prevailing February, 1919
Babbitt metal.....	lb.	\$0.8327	\$0.636
Brakeshoes.....	Net ton	53.66	69.43
Gears GE-67 (69 tooth).....	Each	50.00	50.00
Glass, 30-in. x 30-in.....	Box	8.31	11.87
Ash lumber, 3-in.....	1000 ft.	180.00	160.00
Body color paint.....	Pound	.265	.28
Pinions, W. H. 101 (16 tooth).....	Each	7.92	7.87
Seat rattan.....	Square foot	.38	.38
Soft steel, 1/4 in. x 3 in.....	100 lb.	4.125	3.97
Black insulating tape.....	Pound	.3365	.35
Trolley rope.....	Pound	.608	.76
Trolley wheels.....	Each	1.05	1.05
Cotton waste.....	Pound	.13425	.13375
Wool waste.....	Pound	.2043	.215
Copper wire No. 000—61 strand.....	1000 ft.	143.24	100.00
Magnet wire—DCC, No. 9.....	Pound	.3458	.235
Cast-iron wheels—star special 33 in.....	100 lb.	1.63	1.63
Steel car wheels—standard.....	Each	35.00	38.25
Tee rail—section 80/251.....	Gross ton	70.00	59.30
Girder rail—section 101/486.....	Gross ton	69.60	76.70
Tribly rail—section 116/434.....	Gross ton	71.10	76.70
Treated ties—yellow pine.....	Each	1.73	1.89
Tie rods.....	Each	.775	.70
Wood paving block.....	Square yard	2.26	2.48
Granite block (Newark specification).....	1000	115.00	112.00
Spikes 1/4 in. x 5 1/2 in.....	100 lb.	4.85	4.30
Copper ponds, 36 in.....	100	123.42	112.20
Feeder 500,000 circ.mil. W. P.....	Pound	.262	.205
Trolley poles—30-ft. steel.....	Pound	.055	.057
No. 00 trolley wire.....	Pound	.2682	.18
Charcoal.....	Net ton	35.00	30.00
Coal, chestnut (for car heating).....	Ton	5.90	8.10
Salt.....	Sack	.87	1.40
Wrapping paper, 36-in.....	Pound	.1105	.09
Copy sheets.....	1000	1.60	1.70
Car records.....	1000	2.239	2.70

Weighted average increase 1918 over 1917—82.30 per cent  
Weighted average decrease 1919 from 1918—2.25 per cent

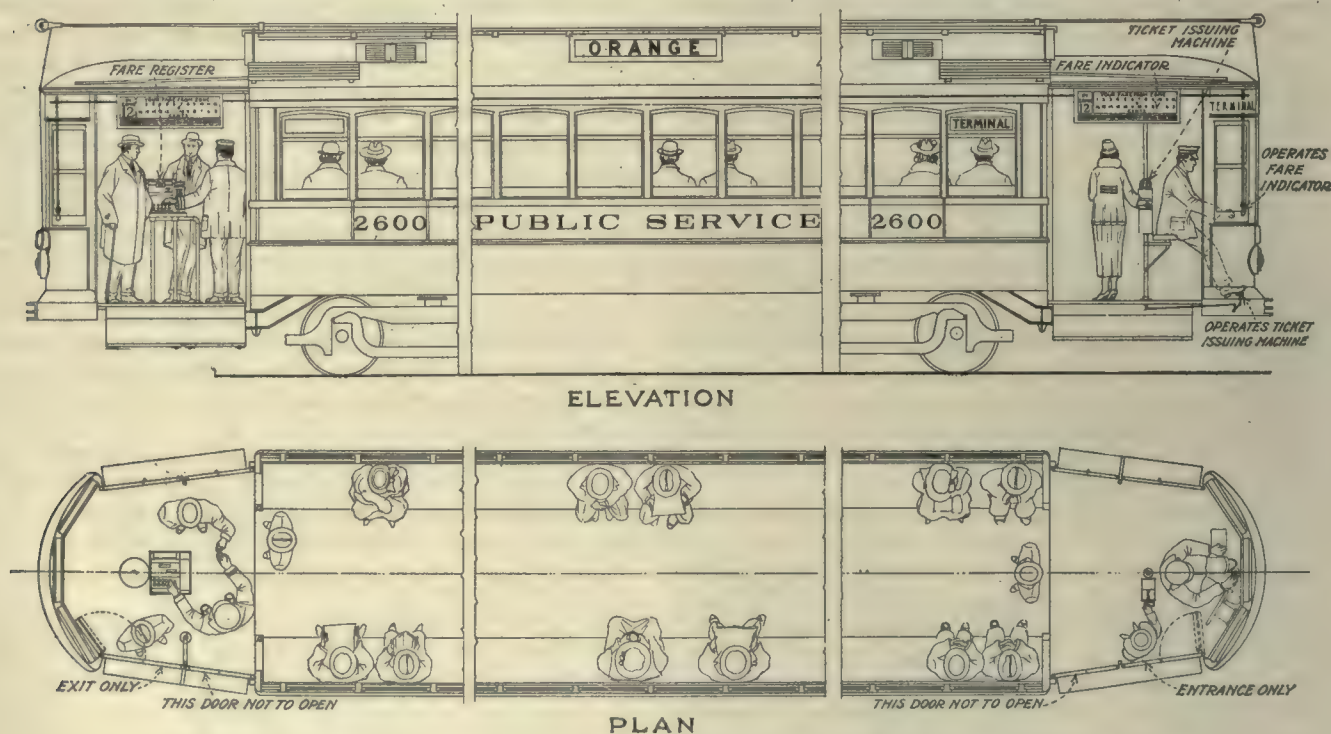


fore been applied in such work, the report points out. In all cases city fares are collected in the ordinary manner, registration being effected with a fare box, with or without the use of an overhead register, or some other of the many fare collection devices, now generally employed. The fares on suburban lines, in some cases, are collected in the time-honored method, the conductor going through the car and collecting the fare at each zone limit. Where outlying zones of 1 or 2 miles are used and the schedule is rapid the conductor spends practically his entire time in successive trips through the car collecting fares. The practice is annoying to passengers, keeps the conductor off the rear platform the greater part of the time and therefore increases the likelihood of boarding and alighting accidents. Where different units of fare are collected, as for example, 5 cents for a central area and 2 cents per zone in the sub-

is a slow process and has been confined to suburban and interurban lines on which the stops are comparatively infrequent.

The committee on fare zones early reached the conclusion that the successful application of a zone system in thickly built-up city areas was predicated upon the development of a speedier and safer method of fare collection than had heretofore been applied. The successful system of fare collection must be one in which the opportunity for the conductor to overcharge the passenger is reduced to a minimum and in which no loophole is left by which the passenger can defraud the company out of all or part of his fare. It must be a system under which the opportunity for the conductor to misappropriate the fare is also reduced to a minimum.

Careful study was given to the applicability of the European system of collecting fares. The report



SIDE ELEVATION AND PLAN SHOWING PROPOSED METHOD OF COLLECTING ZONE FARES

urban areas, the methods of registration have involved either the use of two registers, one on which 5-cent fares are registered and the other 2-cent fares; or the use of a 5-cent register for city fares and a duplex ticket for suburban fares. In practice, serious operating difficulties have developed from the use of two registers, dishonest conductors finding it possible to defraud the company by registering 5-cent fares on the 2-cent register or by failing to register all of the 2-cent zone fares collected. This is especially true where, in order to save annoyance to passengers, the entire suburban fare is collected at one time. If a passenger pays 24 cents entitling two companions and himself each to ride through four suburban zones the registration of the fare would require twelve registrations on the 2-cent register. A dishonest conductor will not always register the full number of zone fares.

No company has succeeded in using the duplex ticket to register city fares where the travel is heavy and stops are frequent with a considerable number of persons boarding and alighting at certain points. The registration of fares through the use of duplex tickets

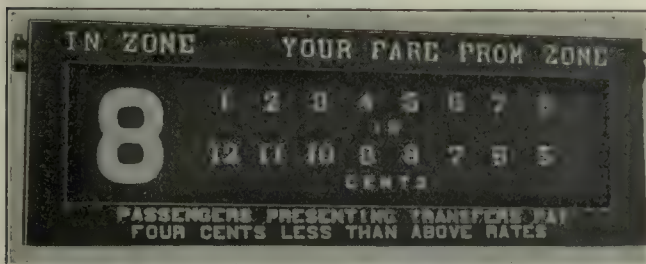
points out, however, that operating conditions in European cities are quite dissimilar to those which prevail on American urban electric railway properties, such as the Public Service Railway. The European car is small, compared with the cars required to handle the traffic in the large cities of this country. Every electric railway operator who has heretofore considered the zone system has obviously concluded that European collection methods were not applicable to the conditions existing in American cities and the committee on fare zones after deliberate consideration came to the same conclusion.

#### FARE COLLECTION THE KEY

It was early recognized that the success of the entire investigation depended upon the solution of the fare collection problem, and a very large amount of time and study has been devoted to this matter. Unfortunately, no method was at hand which it was felt would meet the requirements, and the problem before the committee on fare zones was therefore one of working out a method that would prove satisfactory under operating conditions



prevailing on this property. The foundation of a successful system of fare collection obviously rested upon devising or adapting instrumentalities of collection and registration which would insure accuracy and honesty on the part of the conductor and protect him against the imputation of dishonesty. The underlying principle of successful registration of zone fares is involved in visible registration of the fare; showing not only that the fare had been collected but the amount paid as well. The plan sometimes heretofore followed of using two or more overhead registers, on one of which the nickel, for example, would be registered while pennies were registered on another, were discarded as cumbersome and impracticable, being wasteful of the time of both passenger and conductor and presenting too great possibilities of dishonesty. The conclusion was reached that the principle of the practicable register for zone fares was embodied in the modern cash register, whose distinguishing characteristic is the ability to register sums of varying amounts by pressing different keys, the amount registered being shown plainly by an indicator visible alike to the passenger paying the fare, the conductor or indeed anyone in the car. The universal application of the cash register to retail business is a



ONE OF THE FARE INDICATORS AT EACH END OF THE CAR

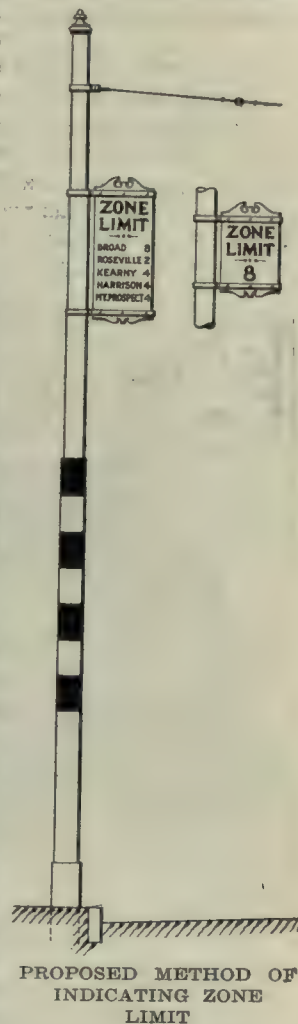
matter of every-day comment. A large percentage of the stores selling merchandise of various kinds have found it advantageous to install cash registers because of the accounting advantages afforded by the machines and more especially because of the effect which such devices have exerted in checking dishonesty or forgetfulness to register sales on the part of clerks. There is no reason why the same safeguards cannot be applied with equal success on the street car as in the retail store. The ordinary individual instinctively looks at the cash register indicator to see the amount which the clerk has rung up. He becomes a volunteer inspector, as it were, for the proprietor, and he is not willing to pay a sum greater than the amount which the clerk has registered on the cash register.

But the cash register in the form in which it has heretofore been manufactured was not suitable for the purpose of fare collections under a zone system. In the first place, the standard keyboard of the cash register and the mechanism which controls is so constructed as to ring up amounts in the following multiples: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 20, 30, 40, 50, 60, 70, 80, 90. Larger machines are built on the same principle; the essential difference being that it is possible to register dollars in addition to the amounts indicated above. It was considered inadvisable to introduce a machine in which any considerable number of fares would have to be registered by pressing two keys. Under the standard keyboard this would be necessary with any fare over ten cents excepting even amounts—

20 cents, 30 cents, 40 cents, 50 cents, etc. On long lines such as exist upon the Public Service Railway and on which heavy traffic is carried, a considerable number of fares greater than 10 cents must be registered. In addition, certain protective features later described were considered essential, which were not found in any model of a cash register heretofore placed upon the market. As the manufacturers of these registers were busy with war work, the zone committee on its own account undertook the work of adapting a National cash register of current model to meet the requirements as they were conceived.

#### DEVELOPING A REGISTER

The keyboard was changed so as to register from 1 to 16 inclusive. A zone indicator was added to show both to the passenger and to the conductor the zone in which the machine was then set. A mechanism was attached which locked the machine and prevented its operation except when a key bearing a serial number was inserted in the machine and held therein, and the printing mechanism was so changed as to record on the detail strip (or paper tape) not only the amount rung up on the register, but, in addition, for each amount so registered, the zone indication as it appeared at the time the registration was made, and the number on the key inserted in the register to unlock it. This key number would correspond with the number of the conductor then operating the register. Of course, the adding mechanism had to be materially changed so as to add correctly the new amounts represented by the changed keyboard. A key was also added by which employees' free tickets, transfers and other paper tickets might be registered. When a free ticket is registered a symbol is printed on the detail strip. Where a passenger presents a transfer and pays his zone-mile rate for the journey taken on the transfer, the detail strip shows both the symbol and the amount of money, indicating that the transaction represents a ride on a transfer. A change was also made concerning the totalizers on the register. Three totals are carried; one shows the total number of registrations made, whether cash or ticket; the second shows the number of tickets registered including not only free tickets but transfers; the third shows the total of the cash registration. From the opening and closing numbers of each totalizer the conductor is enabled to make up his day card, which furnishes the basis of his settlement with the receiver in the carhouse.



PROPOSED METHOD OF INDICATING ZONE LIMIT



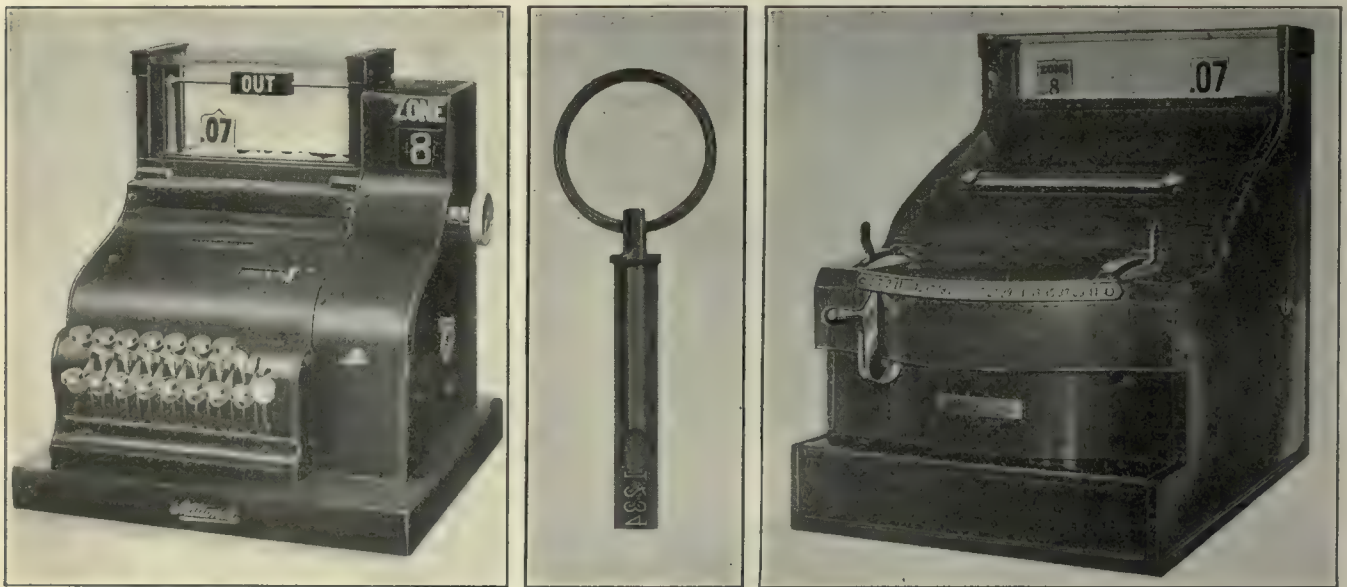
After the armistice was declared, the National Cash Register Company and the St. Louis Cash Register Company developed model registers for the purposes described. They are illustrated herewith, the St. Louis register being of the first model constructed. These registers can be operated only when the conductor's key has been inserted in the machine and while it remains there. The zone in which the car is operating is conspicuously shown.

#### A MACHINE FOR ISSUING ZONE CHECKS

Another mechanical problem which presented itself for solution involved the perfection of a device for issuing identification checks or tickets, indicating the zone in which the passenger boarded the car. Under the conditions such as prevail in rush-hour traffic it was deemed essential that the issuing of such checks should be accomplished through a mechanical device rather

machine for a zone-mile system, it was decided, should be built so as to accomplish the following results:

1. Issue only one ticket at a time; the ticket being presented to the passenger somewhat after the fashion of the ticket-issuing device described.
2. That while the tickets themselves would be numbered serially and therefore a check would be had on the number issued, the device should register consecutively the number of tickets issued, so that it would be possible to check off the opening and closing number of tickets issued, just as is now customarily done by conductors in taking off the opening and closing number of the totalizer on fare registers.
3. That but one form of ticket should be used. A machine which would contain a roll of tickets for each zone through which the car passed would be unwieldy in size, difficult to operate and confusing to the passenger. If only one form of ticket, however, is to



TWO TYPES OF FARE REGISTERS DEVELOPED FOR USE WITH FARE SYSTEM PROPOSED, ALSO CONDUCTOR'S KEY FOR LOCKING AND UNLOCKING REGISTER

than to require the conductor or motorman to hand them to passengers boarding the car. Attention was naturally directed to the ticket issuing device, now almost universally used in moving picture establishments, familiar to almost everyone in the United States. These machines, it will be remembered, are manipulated by a series of push buttons, each of which regulates the issue of a certain number of tickets. If the button bearing the figure 1, for example, is touched, the machine (which is motor-driven) almost instantaneously throws one ticket through an aperture in the brass plate with which it is covered. If the figure 2 is touched, two tickets emerge. The familiarity of the public with such a method of issue—that is to say, with the issue of tickets in the manner in which these machines present them—was considered to be a feature which should be incorporated in the ticket issuing device. The machines used by moving picture establishments, however, did not contain the other features which were essential. The distinguishing characteristic of these machines is the issue of varying numbers of tickets, all of which were alike. It is true, of course, that some of the machines issue tickets of various denominations, but such machines are merely a combination of the essential features of two or more of the simpler models. The ticket-issuing

machine, it is obviously necessary to equip the machine with some sort of printing device so that the machine would print in a conspicuous manner, in a space provided on the ticket, the zone number in which the machine was set at the time the ticket was issued.

4. The machine should be equipped with some sort of telltale, or device which would indicate in a prominent manner to both the trainman and the passenger the zone in which it was then set, the number of the zone corresponding with the number printed by the machine on the ticket as it was issued to the passenger.

5. The ticket issuing device should be inexpensive, rugged in construction and as nearly "foolproof" as possible.

Such a machine has been perfected, and a view is shown, with a picture of the form of ticket issued.

#### DESCRIPTION OF SYSTEM OF FARE COLLECTION

The system which the company proposes to use in the collection of fares after the machines described are received is the pay-leave and it will be conducted as follows:

All passengers board the car at the front door and leave the car by the rear door. Thus a positive movement of passengers through the car will be established



and an even distribution of passengers within the car assured. The ticket-issuing machine, already described, designed to give each passenger an identification slip or ticket, indicating the zone in which the passenger boarded the car, will be located on the front platform and will be operated by the motorman. The fare register will be situated on the rear platform and will be operated by the conductor. At least two fare indicators will be installed in each car; one on each platform, connected by a rod running through the car which will synchronize the two indicators. In other words, when one indicator is changed a corresponding change will be effected on



11448
Passenger Boarded Car In ZONE
8
PUBLIC SERVICE RAILWAY COMPANY
<b>Zone Check</b>
PAY FARE WHEN LEAVING CAR
FARE REGISTER SHOULD SHOW ZONE CAR IS IN
Passenger must hand this check to Conductor When Paying Fare
TARIFF POSTED IN CAR
<i>L. W. C. Co.</i>
INT. TICKET CO., NEWARK, N. J.

AT TOP, ZONE  
TICKET; AT  
LEFT, TICKET  
ISSUING MA-  
CHINE

where the zone limits are situated and the number of each zone, the limits of each zone will be marked by appropriate signs attached to poles, the base of the pole being striped to make it stand out conspicuously. The system of marking the zone limits is illustrated in the cut appearing on page 601. The illustration shows two types of marking. The marker on the left of the illustration, attached to a full length pole, is the type which will be used to mark zone limits on track-ages used by two or more car lines. The number of the zones on each line appears opposite the name of the line on the zone limit sign. The second type of marker, appearing on the right of the illustration, attached to but a portion of a pole, is the type which will be used to mark zone limits on stretches of track used by only one car line. The number appearing under the words "zone limit" indicates the number of the zone into which the car is about to pass. The company believes that it will require but a few days for patrons to familiarize themselves with the zone numbers in which their homes and places of business are situated. If a journey is taken over an unfamiliar line the zone-limit signs will serve to familiarize passengers with the zone numbers in which their points of origin and destination are located. It is the intention to post conspicuously in the cars on each route the limits and numbers of the several zones so as thoroughly to acquaint passengers with the new arrangement, and to promote public understanding of the system.

The zone identification tickets, an illustration of which appears on this page, are printed in sheets or strips, each ticket being serially numbered. The sheets of tickets are folded and inserted in the bottom of the ticket-issuing machine. Prior to the time that the ticket passes through the machine and is issued by it, the space at the top of the ticket on which appears the large numeral 8 is blank. When the motorman manipulates the machine by pushing the treadle the ticket is fed through a simple printing mechanism which prints in the blank space above referred to a large numeral corresponding to the zone in which the passenger boarded the car; cuts the ticket from the sheet; registers the operation on the totalizer which constitutes a part of the machine, and issues the ticket to the passenger.

When the passenger approaches his destination he goes to the rear of the car and presents his identification check to the conductor. Both the passenger and the conductor have before them a fare indicator, one of which it will be remembered, is located on each platform, the two being connected by a rod passing through the car. The purpose of the fare indicator is to enable both passenger and conductor to ascertain quickly the fare which the passenger should pay. The appearance of the fare indicator is shown in the illustration on page 601.

The large numeral 8 appearing at the left of the indicator shows the zone in which the car is operating. If the passenger about to pay his fare had boarded the car in zone 6 and was alighting in zone 8, he could quickly ascertain the fare by looking for the figure 6 in the first line of figures shown on the indicator and the amount below this figure.

This amount is paid to the conductor who registers it on the cash register. At the same time he collects the passenger's identification check. As all transactions are recorded, an audit is easy. The company will retain its prepayment areas at ferry terminals, with only a slight change in its method of collecting fares.

the other. The general appearance of the car as thus equipped is shown in the sketch on page 600.

The motorman will be charged with the duty of advancing the fare indicator as the car proceeds from zone to zone, and of advancing the ticket-issuing indicator so as to insure the issuing of identification checks bearing the proper zone number. These operations can be done without any trouble, ratchets being provided so that with a simple movement of levers both can be advanced. Passengers boarding a car will be quick to call the motorman's attention to the fact that he has failed to advance the zone indicator on the ticket-issuing machine if the zone limit has been crossed, for a check or slip bearing the number of the preceding zone increases the passenger's fare. The ticket-issuing machine will be operated by a treadle, thereby reducing to a minimum the amount of work required of the motorman. As there will be no necessity for issuing checks or identification slips except when the car is stopped to allow passengers to board, the motorman's attention will not be diverted from the operation of his car. It is believed that the necessity of issuing identification slips to each passenger boarding the car will tend to reduce accidents arising from premature starting of cars.

In order that both the public and trainmen may know



Conductors will be required to make up trip envelopes at the end of each half trip, inserting therein the passenger identification checks issued and collected during that trip, together with the employees' tickets and transfers which were collected. These envelopes will be sealed and placed in a container, so constructed that they cannot be removed by the conductor. Thus, any holding out of envelopes from one trip to another will be detected because the envelopes will not be found in the container in the order in which the trips were made.

Conductors will be required to note on the face of the trip envelope the direction of the trip, inbound or outbound, the scheduled leaving time, the number of tickets and transfers collected, the number of cash fares registered, and the run number, trip number and conductor's name and badge number. Any attempt on the part of the conductors to mix identification checks collected on different trips will be immediately detected because the serial numbers on identification checks issued on a particular trip will run in consecutive order. Missing numbers should represent the checks issued to passengers who lost them or purposely withheld them from the conductor. In such cases, conductors will be instructed to assume that the passenger has boarded at the end of the line. The total number of identification checks turned in by a conductor on the several trips made by him must agree with the difference between the closing and opening number on the totalizer of the ticket-issuing machine.

The company admits that some slowing down of schedules may occur until the public has become thoroughly familiar with the new system, and the results of the first few days will therefore not be a fair criterion of the possibilities of the new system. But it believes that after the public has become familiar with the system, the location of the zone points and the numbers assigned to the zones between which they customarily travel and the rate of fare applying thereto, and after the conductors have had several days' experience in the new method of fare collection, no slowing down of schedules will occur and that the public will be well satisfied with the new system of fare collection. The opportunity afforded passengers to select their exact fare from their supply of small change while riding to destination will also be a great convenience, especially in winter weather or on rainy days. It is believed that even a larger percentage of persons will have their exact fare ready than is now the case, since it is to the passenger's interest to pay his fare as quickly as possible in order that neither he nor those who follow him may be delayed in leaving the car. There is nothing inherent in the plan, it is thought, which complicates the problem of making change.

### Percentage of Increase in Food Prices

According to reports received from retail dealers by the Bureau of Labor Statistics, the retail price of twenty-two of the most essential articles of food, combined, for the United States was 2 per cent higher on Dec. 15, 1918, than on Nov. 15, 1918. Comparing December, 1918, with December, 1917, the increase in the cost of these twenty-two food articles, combined, was 19 per cent. During the five-year period, December, 1913, to December, 1918, the cost of all articles combined shows an increase of 79 per cent.

### Car Maintenance Data from Aberdeen

From 8000 to 15,000 Miles Wear Is Obtained from Motor Bearings, and Wheels Wear About  $\frac{1}{8}$  In. per 5000 Miles

THROUGH the courtesy of William Forbes, general manager, and A. R. Fyfe, works superintendent Aberdeen Corporation Tramways, some interesting comparative statistics are available on equipment life in that city.

Four types of motors are in use: Old-style 25-hp. Westinghouse motors, whose white metal bearings are good for 8000 miles on 32-in. wheels; Westinghouse No. 200 35-hp. special high-speed motors, whose white metal bearings are good for 15,000 miles wear before renewal; Brush No. 1010-G motors, with oil (syphon) lubrication whose bearings are renewed after 12,000 miles wear; British Thomson-Houston No. 200-K 35-hp. interpole motors which first went into service on April 3, 1916, and after two years and ten months of service the tin-lined armature bearings show very little sign of wear. These latest motors are now on eighteen cars. Their lubrication is waste packing and Galena oil. Figuring weekday mileage at 130 miles and Sunday mileage at 100 miles, the first of the GE-200-K equipments has now given most satisfactory service for about 125,000 miles.

Of the motors named above, the first three have gears of 5-in. face and a ratio of 14/68; the GE-200-K gears have a face of 4½ in. and a ratio of 14/67. All gears are lubricated with graphite. Recently the only gears obtainable have been of the split form, although solid gears are preferred. Gears are good for 250,000 miles; pinions for 100,000 miles.

At present all motor coils are bought complete from the motor manufacturers. An impregnating plant will be installed in the new works at an early date. Morganite brushes, used at 5 to 6-lb. tension per brushholder, are standard for all motors.

Recently the wheelbase of the trucks has been lengthened from 6 ft. to 7 ft. to decrease oscillation. These trucks are fitted with the Glasgow Engineering Company's axles of 4-in. diameter, 4½ in. at gear seat and 3½ in. at the journals. To minimize breakage, the keyway of these axles is no longer square but is undercut about ½ in. at the sides to get a rounding effect. These axles are used with steel-tired wheels which are of 32-in. diameter when new and 28½-in. diameter when discarded for retiring. About 35 per cent of the wheels make the full tire life of 75,000 miles without being turned, the remainder being turned once before scrapping. A turned tire averages 65,000 miles. Roughly, the wear of tires is at the rate of ½ in. per 5000 miles. The allowance in case of shrinking on tires is  $\frac{1}{16}$  in. less 9/1000 in. Axles are pressed into the centers at an average of 32 (long) tons per square inch with an allowance of 6/1000 in. The wheels come from Brown, Bayley's Steel Works, Ltd.

Even in the existing cramped quarters of the car maintenance department several thoroughly modern features are noticeable, such as separate motor drive for most of the machine tools. At an early date the Aberdeen Corporation Tramways hope to secure possession of the building erected for the new works but now occupied for military purposes, and it will then be possible to carry on the upkeep of equipment under more favorable conditions.



# Conservative Views of Electrification

At A. I. E. E. Meeting Held in Boston On March  
14 Discussion Brought Out Limitations as Well  
as Virtues of Electrification of Steam Railroads

**T**HE American Institute of Electrical Engineers held its 348th meeting at the Hotel Copley Plaza in Boston, Mass. The morning session was devoted to the subject of "Electrification of Steam Railroads," with an introduction by Calvert Townley and informal statements by several other leaders in this part of the electrical field. Abstracts of Mr. Townley's paper and of some of the contributions to the discussion follow:

## Some Possibilities of Steam Railroad Electrification as Affecting Future Policies

BY CALVERT TOWNLEY

Assistant to the President, Westinghouse Electric & Manufacturing Company, New York City

**E**LECTRICITY now performs every railroad service previously rendered exclusively by steam locomotives, and in every case does it better than it was done before. But in order to use electricity a large investment in equipment and installation must be made and electrification has proceeded slowly because railroad executives were not convinced that the advantages to be gained are always worth the cost.

The progress of electrification has also been impeded, first, before the war by the difficulty in financing due to conditions other than the merits of electrification, and second, since the war began because every one has been too busy to consider any work that could be deferred and because the government's taking over the railroads has created an unsettled situation not conducive to the investment of new capital for future returns. Now, however, there seems to be ground for hoping that these bars to progress will be removed in the not distant future so that electrification can be again studied on its merits. Therefore our consideration of the subject is timely.

The electrification of a railroad is not simply the substitution of one kind of locomotive for another; it is the adoption of a fundamentally different method of train propulsion. It is conservative to say that, within the bounds of ordinary practice, electricity can furnish every train with all the pulling power that can be used. The limitations of the steam locomotive in this respect disappear and ruling grades rule no longer. A strictly limited motive power is replaced by one that is practically unlimited.

### ELECTRIFICATION SYSTEMS ARE ESSENTIALLY ALIKE

There are a number of so-called "systems" of electric traction, and heavy emphasis has been laid by the advocates of each upon its points of difference from every other. So much has been said about these differences and so little about the points of similarity as to create an entirely misleading impression. It is a fact that there are more kinds and types of steam locomotives in use many times over than there are electric systems. It is a fact that except for the storage-battery loco-

motive, which has but a limited field of application, all electric systems have many more common features than differences. It is a fact that they agree on fundamentals and differ in detail only. Their costs may not be the same, their efficiencies may vary but they all do their work and do it successfully and well. The possibility of unlimited electric power is a characteristic not of any one system but of all. It is due to basic differences between steam and electric equipment. A steam locomotive is a complete independent unit which not only generates but also utilizes its power. The electric locomotive generates no power at all. It is only a translating device receiving energy from an outside and a remote source. The electric power house, always having much greater capacity than any one locomotive, can supply ample power for the heaviest train on the steepest grade. The steam locomotive which carries its own power house with it is limited to the capacity of its one boiler. By the multiple-unit principle, as many electric locomotives as may be needed can be coupled together and operated in synchronism by one crew from any cab. Any required tractive effort can thus be exerted without slipping the wheels, without imposing undue strains on the rails or bridges and without increasing the number of engine crews.

### ELECTRIFICATION ACCOMPLISHES SEVERAL SPECIFIC THINGS

The business of a railroad is to transport freight and passengers. I put freight first because on the average it produces 73 per cent of the revenue. Unlimited motive power permits longer trains and higher schedule speeds. It cuts the operating cost by hauling more cars with the same or a smaller crew. These new opportunities at one fell swoop banish many of the railroad's time-honored traditions. The traffic possibilities must be studied from a new angle and advantage taken of every facility. It is a new thought to realize that train length is limited not by motive power but by the yard tracks and length of sidings, or that all the trailing tonnage that the drawbars will stand can be hauled. Nor are these new limits fundamental. Sidings can be extended, drawbars can be made stronger, if it pays to do it. In a word electrification opens up tremendous possibilities of increasing the freight capacity of a road and without it being necessary to build additional tracks.

While not as important as freight, passenger traffic likewise comes in for its share in the widened horizon and the vanishing tradition. Unlimited power, of course, is available but the absence of combustion is another basic advantage. Smoke and cinders disappear. Tunnel operation loses its terrors. Unobscured signals permit normal speeds with undiminished safety. Aerial rights over city terminals are now valuable. Multi-unit operation has in fact made suburban traffic. The rapid acceleration made possible by electric traction has directed attention to the equal value of rapid retardation and has quickened the study of braking accordingly; also of modified coach design to bring about the more



efficient loading and discharge of passengers. These combined possibilities secure increased schedule speeds and attract patronage. In passenger as in freight traffic the ability to do something that could not be done before, rather than to do the same thing at a lower cost, is the most valuable attribute of electrification, and again we find a greatly augmented capacity without the need of additional tracks.

#### SHOULD ALL RAILROADS BE ELECTRIFIED?

It is not my purpose to make an exhaustive comparison of the relative advantages of steam and electric operation. That has been done often and well by others. What I have said about the expanding opportunities for electrified service is by way of illustration to emphasize my plea that the question should always be viewed in its broader aspect and not hampered and restricted within any narrower limitations than properly belong to it.

I am going to assume, then, the broadest possible treatment and to suppose that every electrification project is to have its pros and cons most fully examined. The real and vital question then is, "How far will this lead us?" "To what extent may we expect complete electrification of all our roads?" Parts of a number of them have already been equipped. Many of these are numbered among our prominent roads, successful corporations which have had the advice of the most highly skilled executives and engineers, and which are progressive. Now, every one of these projects has been successful. Every one has justified itself. Nearly every one in its present scope represents an extension of the zone initially electrified, the most convincing evidence possible as to what views the operating companies hold regarding these several projects. Railroad officials are generally glad to give others the benefit of their experience, so it is reasonably safe to say that operating statistics are available covering long enough periods so that the results to be expected from any proposed undertakings may be predicated on established facts and not upon theories. In the light of present-day knowledge, therefore, what answer can we make to the question "Should all railroads be electrified?"

Taken together in 1910 there were in the United States 240,000 miles of railroad main line regardless of the number of tracks. Of this mileage approximately 1250 or one-half of one per cent has been electrified or is today in process. The remaining 99½ per cent comprises, of course, roads performing every variety of service. They range from the back country branch line built by some over enthusiastic promoter and now, perhaps, operated as part of a large system only because operation cannot be avoided and regularly contributing its annual deficit, up to the most important through arteries of travel upon which the commerce and industry of the nation depend. Every sort of community is served; every kind of railroading has its place in this vast aggregation of effort and the variables in the problem are so multitudinous and their nature often so profound as well to daunt the courage of one who seeks to formulate them for incorporation in a general statement. Fortunately or unfortunately, depending on the point of view, it has been my lot to have to deal with this electrification problem from both sides.

I am a thorough believer in the virtues of electrification and an enthusiast about the wonders which it can accomplish, but I also have a keen appreciation of the almost infinite variations in the railroad problem and

a very wholesome respect for the dollar. I do not believe that all railroads will ever be electrified. I am not sanguine even that all the tracks of any one really big system will be so equipped in our time. It is a question of economics. Electrification will increase the track capacity. But there are thousands of miles of railroad that have sufficient capacity now, frequently several times over, and where the wildest stretch of imagination fails to picture a future need of this kind. Electrification works wonders in suburban and interurban passenger service. I have ridden for hours across the western prairies without seeing a single town, much less a city where these advantages would count. Electrification effects marked economies in fuel, in maintenance, in labor and otherwise through a long list; but electrification calls for a heavy investment and unless these economies bulk large enough, the interest on such investment will wipe them out and turn the enterprise into a losing venture. I do not believe the cause of electrification is helped by undue optimism on the part of its advocates. Rather should there be an enlightened partisanship, enthusiastic where enthusiasm is justified but tinged with the sober conservatism of the man who has to put his own dollars to work.

There need be no discouragement to the electrical engineer in the views just given, nor to the railroad man who has looked toward the new motive power for salvation. There are so many cases where electricity should be used, where its advantages are clear and conclusive, that once the railroads escape from the financial slough of despond in which they are now wallowing and are again able to get capital for their needs there will not be enough engineers, there will not be enough electric factories in the country to serve them. Every big system has need of electricity somewhere. For some small roads it may mean the difference between solvency and bankruptcy. There can be no rule established. Generalities are sure to be misleading but electrification is now firmly intrenched and successful. It is recognized by railroads generally as an effective agency with great possibilities and one which is particularly valuable for certain specific purposes. Time alone will tell how broad its application is to be but I am confident we can await developments with tranquility assured that the art is in a healthy condition and the progress will be along the right lines.

#### *Discussion of Mr. Townley's Paper*

Frank H. Shepard, Westinghouse Electric & Manufacturing Company, said that every "hard-shelled" railroad man will concede that electrification means better service and a better railroad. The broadest vision is necessary in expanding our railroad facilities. New terminals, second tracks, revision of lines, etc., are not always immediately remunerative, hence the long look ahead is necessary. Admittedly the cost of electrification is of the order of the expense required to duplicate the present way and tracks, say \$15,000,000,000 for all the roads of the country. The railroad traffic of the country doubles about every twelve years. Electrification will enable double the traffic of a railroad to be handled with virtually the same plant in roadway and tracks. Studies have been made for the application of as high as 18,000 hp. Tests of a single locomotive utilizing 8000 hp. and of a train consuming 15,000 kw. have already been made.

More efficient use of labor results from electrification,



said Mr. Shepard. All steam railroad practice has been built up around the steam locomotive and its limitations. Engine stages of 100 miles or thereabouts are an outcome of these limitations. An electric locomotive engine stage of 500 miles is conceivable. The economies of electrification are greater than are ordinarily pictured.

#### THE POWER TRUNK LINE AND ELECTRIFICATION

W. S. Murray, consulting engineer New York City, pointed out that in future a composite railroad-electrical man will be needed to meet electrification requirements properly. The attempt to electrify all the railroads of the country should not be made. It is very significant, however, that electrical operation has succeeded in every branch of railroad service—terminal, freight, passenger and switching.

Referring to the plan of trunk-line power supply lately fostered by Secretary Franklin K. Lane, Mr. Murray pointed out that in 1914 he had become interested as an engineer in the possibilities of centralized motive power supply for the six principal railroads operating into the New York City district on the western side of the Hudson River. Here appeared an excellent opportunity to form a power equipment company to work out a standard equipment for service in this district. This plan gradually evolved into a regional one.

Mr. Murray said that he had given much thought to Secretary Lane's proposed super-power generation, transmission and distribution plan for application in the regional districts between Boston and Washington and was in accord with it. By such an arrangement is offered the opportunity for propelling all trains in the region by electricity, and at the same time supplying all industrial concerns with like power. He said further that at first blush the super-power plan would appear to be a "large order." This is so, but the world is full of big problems and of as big men to solve them. The importance of reducing the fuel consumption per kilowatt-hour can hardly be exaggerated. The amount of wasted coal in this country, especially in the Eastern district, is almost criminal.

Carl Schwartz, electrical engineer New York Central Lines, in a written communication pointed out that the cost of electrification involves many other items in the way of track, terminal and signal system changes which make its economic success more difficult under present conditions. The general standardization of motive power along broad lines is highly desirable, he stated. This can now be done without the exclusion of special systems which have proved their merit.

#### FUEL CONSERVATION DEMANDS EXTENSIVE ELECTRIFICATION

W. B. Potter, chief engineer of electric traction General Electric Company, contributed a written discussion pointing out that electrification necessitates no radical changes in the handling of transportation, but minor changes are usually essential in order to secure the full benefits made possible by the increased power, speed and continuity of service in the individual unit as compared with steam. The objection is sometimes cited that electrification does not provide equal facilities with steam for handling an emergency congestion of traffic. This is not always true, but granting it in some instances, it is an emergency only and should be regarded as such. This condition is more than offset by features of electric railway operation which go far to-

ward removing the possibility of congestion. Thus, the electric locomotive is at its best during the coldest weather, when the steam locomotive is most limited in its capacity.

The investment for electrification is, Mr. Potter said, undoubtedly the most influential factor affecting its advance. With the engineer rests the responsibility for revising and utilizing such equipment as will insure the best economical return to successful service. Electrification operated from hydraulic power offers the only known method of conserving our limited supply of coal and oil. Even when hydraulic power is not available, a saving of more than two-thirds of the fuel and much of the fuel haulage can be obviated by the erection of steam power plants suitably located and furnishing electrical energy from the coal burned in modern practice. An illustration of the coal consumption and the traffic lost incidentally by burning fuel on a small scale in individual units is given by the fact that nearly one-fourth of the coal mined in the United States is used on steam locomotive tenders; that 5 per cent of the ton-mileage moving over our railroads is occupied with hauling this coal again for railway purposes, and that 7 per cent of the ton-mileage is occupied with hauling this coal again in the tenders back of the steam locomotives.

The coal and equivalent oil used on the steam locomotives of the United States in 1914 totaled 140,000,000 tons of coal. The ton-miles moved in the same period, excluding the tonnage of locomotive tenders and 75 per cent of the railway coal was 930,000,000,000 ton-miles. If the same tonnage had been moved electrically, basing figures on an energy consumption of 40 watt-hours per ton-mile, the annual energy consumption would have been 37,200,000,000 kw.-hr. If this energy had been obtained from steam power houses at 2.2 lb. of coal per kilowatt-hour, instead of the 140,000,000 tons actually used there would have been required 40,000,000 tons of coal. This shows a net saving of 100,000,000 tons in one year. A still greater saving would have been accomplished in proportion to the amount of hydroelectric power available.

#### LESS THAN 5,000,000 KW. WOULD MEET PRESENT REQUIREMENTS

There are frequent misconceptions as to the amount of power involved in railway electrification. The figures just given form a basis for illustrating this rather emphatic point. If the tonnage moved in the United States on steam railroads could have been handled by the expenditure of 37,200,000,000 kw.-hr., this would be equivalent to an average load of 4,250,000 kw. This is not an exorbitant amount compared with the power plants already installed. In 1917 the power station capacity in the United States, including central stations, electric railways and isolated plants was about 20,000,000 kw. Thus there is installed electric power station capacity equivalent to four or five times the power which would be required for operating all the railroads in the United States electrically.

Mr. Potter stated that while he agreed with Mr. Townley that it is very improbable that all the railroads in the United States will ever be electrified, it is at the same time interesting to note what the power demand of these roads would be and the saving of coal that would result from their electrification. The further development of central district stations with either fuel or water as their source of power will afford the most di-



rect means of conserving coal. The existence of such large central stations located at strategic points throughout the country, even if primarily installed for railway use, would of itself further and develop the use of electricity for various industrial purposes, and by so doing would affect the coal consumption more widely than the item of railway coal alone.

#### FINANCIAL FEASIBILITY IS NOW THE CRITERION

George Gibbs, chief engineer Pennsylvania electrification, New York City, also presented a written discussion. He maintained that it is most important to combine the advantages of electric operation with improved railroad practice, and that something beside the purely electrical specialist is needed to solve such problems. In the early days of electrification the chief concern of railroad men was whether electrical apparatus was capable of performing heavy railroad service and electrical engineers were busy weeding out defects and limitations. During this period that much-heated controversy arose among engineers as to the best electrical system for general adaptation. The settlement of this particular question at that time was, to say the least, premature; as has since been demonstrated by the parallel development of systems having great flexibility. Even now, when it has been conclusively proved that electric traction by more than one system is technically feasible, evolution is still in process and the standardization of systems and apparatus, except as regards certain general features, should be relegated to the background in discussing the results following railway electrification.

The question, Mr. Gibbs said, had really now changed from technical to financial feasibility. There are few railroads which in these times face the very heavy expenditures required for electrification except to secure immediate large operating economies either directly or by an increase in the capacity of the road, or in the stimulation of new business, any one of which or all taken together produces sufficient added net increase to at least pay the fixed charges on the new investment. The attention of our government was directed during the war toward the electrification of railways as a possible way of increasing capacity for emergency service; also as a means of fuel conservation. The railroad administration was somewhat at a loss to determine just what it should do in the matter on account of the conflicting views expressed in and out of railroad circles by technical and non-technical advisors. Some way must now be found of attacking the railroad electrification problem with a combined technical and transportation knowledge.

Any general electrification of railway systems in this country is an absurdity economically, by any present electrical system. But on the other hand, there are a number of instances where electric traction is indicated as necessary or advantageous. In some cases the direct savings will be sufficiently attractive to warrant the expenditure, but more often the deciding factor should be the indirect savings produced. The determination of these indirect savings generally involves important alterations in operating methods, facilities, etc., and it is therefore essential that engineers who are called upon to report upon electrification projects should be familiar with transportation methods as well as with the electro-technical side of the problem.

John Murphy, electrical engineer, department of railways, Ottawa, Can., pointed out that only 3 or 4 per cent of the heat energy of the fuel is utilized at the

driving wheels of the steam locomotive. He spoke appreciatively of the co-operation of the United States Fuel Administration in supplying coal to Canada during the war period, thereby averting much suffering.

#### ELECTRIC LOCOMOTIVE CANNOT BE OPERATED ON STEAM BASIS

N. W. Storer, Westinghouse Electric & Manufacturing Company, said that the ultimate results of electrical operation are too broad for present vision; that years of evolution will follow the initial development. "We must thank the steam railroad man for his conservatism," said Mr. Storer. "It is a mistake, however, to operate the electric locomotive on the same basis as the steam outfit. The whole plan of operation must be changed to fit the service possibilities of the electric locomotive." The speaker touched upon the value of proper distribution of traffic throughout the twenty-four hours, and pointed out that where shipments are heavily bunched, as in sending out fruit trains in California, with intervals perhaps of days between successive dispatches, electrification *per se* would not be economically attractive. Again, the cost of providing extra equipment to enable wrecks to be cleared up more quickly than normally is not warranted. The opportunities of the future are very great, and all that need be considered at present are cases where the need for electrical operation is a crying one, as in the case of tunnels, large terminals, etc. Building over city tracks where electrical operation is carried on, is a most desirable procedure. The speaker characterized Mr. Murray's vision of a super-power system as most inspiring and easily within the range of possibilities. He contended that we owe it to future generations to conserve natural resources. The United States spent in four or five days of war enough money to electrify all the terminals in Chicago. "Why then," said he, "should we hesitate to spend money for such a constructive improvement as electrification?"

Major George F. Sever, New York, spoke briefly of the importance of fuel conservation on the Pacific Coast, where coal is an almost unknown quantity. Oil and water are there the chief sources of electrical energy. The railroads are now using about 40,000,000 bbl. of oil yearly and the public utilities of California 1,000,000 bbl. The United States shipping now needs 30,000,000 bbl. yearly, and other users in California consume 40,000,000 bbl. per annum. California produces 110,000,000 bbl. of oil yearly, compared with 350,000,000 bbl. in the entire country. Hydroelectric power development is therefore absolutely necessary in California for both railroad and public utility operation. In 1914 oil cost 40 to 50 cents per barrel; it is now \$1.50 at the California wells, and at some other points on the Coast is \$1.85. More than \$3,500,000 easily can be saved in California yearly by interconnection and hydroelectric supply; the mountain passes are well suited to electrical operation of trains, and the increasing scarcity of oil deserves close consideration. In closing, Major Sever commended the fuel saving work done in New England during the past year, and pointed out that there is at present little if any surplus of water power available for exportation from this section of the country.

Prof. Charles F. Scott, Yale University, then suggested a resolution indorsing Secretary Lane's "super-power" project, and it was unanimously voted that the board of directors prepare and transmit it.



# American Association News

*The Engineering Association Assigns Subjects to Its Various Committees and Announces New Committee Appointments—The T. & T. Association Also Announces Personnel of Committees—Report from the Bureau of Statistics and Information—Company Section Activity.*

## Engineering Association Committee Assignments

AS EXPLAINED in the issue of this paper for Jan. 25, page 196, a committee on subjects was authorized by the executive committee of the Engineering Association on Jan. 10 to lay out committee work for the balance of the current association year. The instructions to the committee were that attention should be confined to a few essential topics. Accordingly the following subjects have been assigned:

*To the Committee on Buildings and Structures:* (1) Further study of the subject of fences, with particular reference to concrete posts and methods of casting them. (2) Design of carhouse inspection pits.

*To the Committee on Electrolysis:* Co-operation with the association's representative on the American Committee on Electrolysis, continuing a study of the general subject.

*To the Committee on Equipment:* (1) Co-operation with the National Fire Protection Association in formulating a new code, or a revision of the 600-Volt Code for 1200-volt car wiring. (2) Development of check gages and templates for wheels and truck parts. There are no such standards in existence. The following items are suggested as an outline of the work only, and the committee is asked to go only as far as deemed advisable at present: (a) Gaging points and terms for wheel and track. (b) Wheel mounting and check gage. (c) Brake-beam gage, covering spacing of brakehead. (d) Wheel-flange and tread-contour gage for new wheels. (e) Standard wheel tape. (f) Plane gage for solid steel wheels. (g) Rotundity gage for solid steel wheels. (h) Journal and wedge gages. (3) Standardization of motor parts. It is very desirable that all small parts which go to make up railway motors in the various sizes should be standardized so that they will be interchangeable. This should be possible now in view of the lessons learned during the war and because of similar action already taken by various manufacturers of automobiles and trucks.

*To the Committee on Heavy Electric Traction:* (1) Revision of diagram of location and clearance of overhead conductors, with the suggestion that the height of the hand-brake staff be indicated and that the height of car running board be dimensioned on the diagram in Cases Nos. 4 and 5. (Engineering Manual Ds-62.). The subject before final action is to have the approval of the committee on power distribution. (2) Revision of dimensions on standard diagram of location and clearance of overhead conductors, to include provisions for pantagraph clearance. (3) Advise committee on power distribution of approval or rejection of specification for catenary overhead trolley construction, to cover high-voltage as well as 600-volt direct-current service.

*To the Committee on Power Distribution:* (1) Re-

vision of joint specifications for overhead and underground wire and cable crossings with railroad company's right-of-way. The special committee which was appointed to consider this subject is made a sub-committee of the power distribution committee without change in the personnel of the committee. At present the representation on the joint committee consists of the American Railway Association, the American Railway Engineering Association and the American Electric Railway Engineering Association. It is the expectation that other associations will be invited to participate in this work. This activity results from the fact that the present association standards made in 1913 are somewhat obsolete due to the completion of the National Electric Safety Code. (2) Revision of specifications on wires and cables with special reference to stranding of cables and thickness of 600-volt insulation. The special committee on this subject is made a sub-committee of the power distribution committee without change in the personnel of the committee. This subject is taken up at the request of the American Institute of Electrical Engineers and the War Department, in view of the desirability of using standard-size wires in the make-up of large stranded cables. (3) Standard thread for pins and insulators. This special committee is made a sub-committee of the power distribution committee. The work of this committee has been in progress for some time and it is the desire to secure a final report on this subject as early as possible in order that suitable standards may be adopted.

*To the Committee on Power Generation:* (1) Report on the development of automatic substations. (2) Recommendation of standard form of power contract, for the purchase of railway power. (3) Further consideration of operating performances of railway power stations.

*To the Committee on Way Matters:* (1) Specifications for special work, with particular reference to steam railroad crossings. (2) Development of a spiral for use in the design of switches, mates and frogs. (3) Report on the development of hand and power tools for track construction. (4) Report on the use of a curved head for girder rails with special reference to wheel and track wear. This is to be considered jointly with the committee on equipment.

## Engineering Association Committee Appointments

THE executive committee of the Engineering Association has announced the following list of committee appointments, subject to some revision. In a few cases it is probable that the committees will be expanded somewhat in order that certain subjects may be more completely considered:

*Committee on Buildings and Structures:* C. S. Kimball, engineer of way and structures Washington Railway & Electric Company, Washington, D. C., chairman. R. C. Bird, Central Traction & Lighting Bureau, New York, N. Y.; G. C. Estill, engineer Cumberland County Power & Light Company, Portland, Me.; H. E. Funk, superintendent of buildings Brooklyn Rapid Transit Company, Brooklyn, N. Y.; James Link, chief engineer Knoxville Railway & Light Company, Knoxville, Tenn.;



F. F. Lowe, architect Boston Elevated Railway, Boston, Mass.; H. G. Throop, engineer of way and structures New York State Railways, Syracuse, N. Y.; H. R. Whitney, special assistant to president Springfield Street Railway, Springfield, Mass.

*Committee on Issuance and Distribution of Engineering Manual:* Martin Schreiber, chief engineer Public Service Railway, Newark, N. J., chairman; L. P. Crecelius, superintendent of power Cleveland Railway, Cleveland, Ohio.

*Committee on Equipment:* Daniel Durie, general superintendent West Penn Railways, Connellsville, Pa., chairman; W. G. Gove, superintendent of equipment Brooklyn Rapid Transit Company, Brooklyn, N. Y., vice-chairman; W. S. Adams, designing engineer J. G. Brill Company, Philadelphia, Pa.; J. M. Bosenbury, superintendent of motive power Illinois Traction System, Peoria, Ill.; R. H. Dalglish, electrical engineer Capital Traction Company, Washington, D. C.; H. A. Johnson, superintendent of equipment and shops Metropolitan West Side Elevated Railway, Chicago, Ill.; G. W. Lyndon, president Association of Manufacturers of Chilled Car Wheels, Chicago, Ill.; E. D. Priest, railway engineering department General Electric Company, Schenectady, N. Y.; K. A. Simmon, general engineer Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa.; N. B. Trist, special representative Carnegie Steel Company, Pittsburgh, Pa.

*Committee on Electrolysis:* Prof. A. S. Richey, Worcester Polytechnic Institute, Worcester, Mass., chairman; E. B. Katté, chief engineer of electric traction New York Central Railroad, New York, N. Y.; E. J. Blair, electrical engineer Metropolitan West Side Elevated Railway, Chicago, Ill.

*Committee on Heavy Electric Traction:* C. H. Quinn, chief electrical engineer Norfolk & Western Railway, Roanoke, Va., chairman; A. H. Armstrong, chairman of electrification committee General Electric Company, Schenectady, N. Y.; E. B. Katté, chief engineer of electric traction New York Central Railroad, New York, N. Y.; W. S. Murray, consulting engineer The Connecticut Light & Power Company, Waterbury, Conn.; F. H. Shepard, director of heavy traction Westinghouse Electric & Manufacturing Company, New York, N. Y.; L. S. Wells, superintendent of electricity Huntington Railroad, New York, N. Y.

*Committee on Power Distribution:* C. L. Cadle, chief engineer New York State Railways, Rochester, N. Y., chairman; C. C. Beck, assistant chief engineer The Ohio Brass Company, Mansfield, Ohio; E. J. Blair, electrical engineer Metropolitan West Side Elevated Railway, Chicago, Ill.; James H. Drew, president Drew Electric & Manufacturing Company, Indianapolis, Ind.; C. R. Harte, construction engineer The Connecticut Company, New Haven, Conn.; J. H. Libbey, electrical engineer Bay State Street Railway, Boston, Mass.; P. M. Lincoln, general engineer Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa.; A. Schlesinger, superintendent of distribution and substations Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ind.; Francis J. White, The Okonite Company, New York, N. Y.

*Committee on Power Generation:* A. B. Stitzer, chief engineer Republic Engineers, Inc., New York, N. Y., chairman; C. W. DeForrest, manager electrical department Union Gas & Electric Company, Cincinnati, Ohio; R. W. Eaton, public service engineer, Providence, R. I.;

E. F. Gould, consulting engineer Aurora, Elgin & Chicago Railroad, Cleveland, Ohio; C. R. Greenidge, chief engineer J. G. White Management Corporation, New York, N. Y.; G. H. Kelsay, superintendent of power and equipment Cleveland, Southwestern & Columbus Railway, Elyria, Ohio; E. H. Scofield, engineer of power and equipment Minneapolis Street Railway, Minneapolis, Minn.; W. C. Slade, superintendent of power and lines The Rhode Island Company, Providence, R. I.; Howell Van Blarcom, Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa.; E. P. Waller, assistant manager railway department General Electric Company, Schenectady, N. Y.

*Joint Committee to Consider Safety Code of United States Bureau of Standards:* C. L. Cadle, chief engineer New York State Railways, Rochester, N. Y., chairman; Hugh Hazelton, electrical engineer with L. B. Stillwell & H. S. Putnam, consulting engineers, New York, N. Y.; C. S. Kimball, engineer of maintenance of way Washington Railway & Electric Company, Washington, D. C.

*Joint Committee on Standardization of Method for Determining the Cost of Power:* L. P. Crecelius, superintendent of power Cleveland Railway, Cleveland, Ohio, chairman; E. H. Scofield, engineer of power and equipment, Minneapolis Street Railway, Minneapolis, Minn.

*Committee on Way Matters:* C. H. Clark, engineer of maintenance of way Cleveland Railway, Cleveland, Ohio, chairman; A. E. Harvey, superintendent of way and structures Kansas City Railways, Kansas City, Mo.; vice-chairman; William R. Dunham, Jr., engineer of maintenance of way The Connecticut Company, New Haven, Conn.; H. Fort Flowers, president Differential Car Company, New York, N. Y.; W. P. Graves, chief engineer Montreal Tramways, Montreal, Quebec; C. G. Keen, engineer way and structures American Railways, Philadelphia, Pa.; H. H. Ross, chief engineer Toledo Railways & Light Company, Toledo, Ohio; E. M. T. Ryder, engineer of way Third Avenue Railway, New York, N. Y.; N. B. Trist, special representative Carnegie Steel Company, Pittsburgh, Pa.

The personnel of the committee on engineering standards is not yet complete. It is planned to augment the present committee to secure further co-operation with the engineers of manufacturing companies.

## T. & T. Committees for 1919

THE minutes of a meeting of the executive committee of the Transportation & Traffic Association, outlining plans for the balance of the year, were given in the issue of this paper for Feb. 1, page 244. The personnel of the committees which will carry out these plans is as follows:

*Committee on Code of Traffic Principles:* H. B. Flowers, assistant general manager United Railways & Electric Co., Baltimore, Md., chairman; E. J. Burdick, assistant general manager Detroit United Railway, Detroit, Mich.; A. Gaboury, superintendent Montreal Tramways, Montreal, Canada; Paul E. Wilson, assistant to president Cleveland Railway, Cleveland, Ohio; J. H. Stephens, superintendent Washington Railway & Electric Company, Washington, D. C.

*Committee on Proper Basis of Compensation to City Companies by Interurban Companies, etc.:* R. T. Sullivan, general manager Mahoning & Shenango Railway & Light Company, Youngstown, Ohio, chairman; H. W. Clapp, vice-president East St. Louis & Suburban Rail-



way, Columbus, Ohio; J. F. Collins, general manager Michigan Railway, Jackson, Mich.; A. Swartz, vice-president Toledo & Western Railroad, Toledo, Ohio.

*Committee on One-Man Car Operation:* C. W. Kellogg, Stone & Webster, Boston, Mass., chairman; S. W. Greenland, general manager Ft. Wayne & Northern Indiana Traction Company, Ft. Wayne, Ind.; J. K. Punderford, vice-president The Connecticut Company, New Haven, Conn. Representing Engineering Association on this committee: J. M. Bosenbury, superintendent of motive power Illinois Traction System, Peoria, Ill.; Clarence Renshaw, railway engineer Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa.; J. C. Thirlwall, railway engineer General Electric Company, Schenectady, N. Y.

*Committee on Collection and Registration of Fares:* R. R. Anderson, superintendent of transportation, The Rhode Island Company, Providence, R. I., chairman; T. C. Cherry, vice-president Auburn & Syracuse Electric Railroad, Syracuse, N. Y.; Louis D. Pellissier, president Holyoke Street Railway, Holyoke, Mass.; E. C. Spring, superintendent of transportation Lehigh Valley Transit Company, Allentown, Pa.; C. W. Stocks, general passenger agent, Bay State Street Railway, Boston, Mass.

## Bureau of Statistics and Information Needs Co-operation

THE American Association Bureau of Statistics and Information has prepared a report on its recent activities, from which the following abstracts have been made:

*Bulletin on Wages and Working Conditions of Trainmen* (No. 121). The first edition of this bulletin was issued on March 1, 1919, including replies received to date from 212 companies on Data Sheet No. 185. It contains the most recent information available on the wages of trainmen, including such decisions of the National War Labor Board as apply to above companies. It further contains a very complete summary of working conditions and the general labor situation. It includes the following tables: Wages of motormen and conductors operating two-man cars in passenger service. Wages of operators of "one-man" cars. Wages of motormen, conductors and guards on urban rapid-transit lines. Wages of motormen and conductors operating express and freight cars. Working conditions of trainmen.

The last-named table includes a description of the length, kind (whether straight or swing) and maximum spread of runs; compensation or time allowed trainmen for special work such as over-time, Sundays and holidays, snow plows and sweepers, work cars, reporting for duty, making out accident reports, time taken for meals, etc.; limitations in the making of time-tables, regarding number of parts of runs, method of working meal reliefs, maximum time on cars without relief, payment for intervening time in schedules, length of meal relief, working of maximum number of men in rush hours; ratio of cars operated in rush hours, mid-day and after supper periods.

Another table relates to the labor situation. It includes data on employment of women, labor turnover, strikes and average annual earnings of trainmen.

The bureau urges all companies that have not as yet sent in data sheets do so at once in order that the second edition of this wage bulletin, which will be issued as

soon after April 1 as possible, may include all the companies that have not yet reported.

*Income Accounts and Operating Expenses.* (Data Sheet No. 186). The principal financial statistics of the electric railway industry are contained in the compilation which is now being made. A report was made at the mid-year meeting, based on replies from 136 companies. These are the same data as requested by the Association War Board and published in Bulletin No. 36. These covered 388 companies and proved effective in the presentation of the electric railway case before the national authorities.

Report forms showing operating expenses in greater detail and conforming to the I. C. C. classification of accounts, have been sent out by the association, which will permit the compilation of these data to be made each month. It is the expectation to show from this information the monthly operating expenses per car-mile, segregated by the operating department and divided into groups representing city operation, interurban operation and combined city and interurban operation. It is believed such information representing the most recent available data will be extremely useful to member companies.

In this connection, President Pardee in his letter to electric railway executives, dated Feb. 13, 1919, states:

Such information should be continuously available and we trust that we may have your further co-operation in a continuance of these reports from month to month, in order that the association and its various committees which are grappling with the problems now before us, may have at all times full information upon the condition of the industry. Monthly blanks for this purpose are inclosed herewith. Unlike the case of the steam railroads, there is no clearing house of statistics to which electric railways report. The need of a central agency of this kind is pressing. The association is undoubtedly best equipped to perform this work and will perform it if you will furnish us with the data.

*Skip-stop Bulletin.* A bulletin on skip stops was issued on Feb. 15, 1919, containing the replies of more than 100 companies on Data Sheet No. 188. This bulletin is in the form of a report, showing the advantages and reasons for retention of the skip-stop system. The purpose of this bulletin is to explain to the public at large the general advantages of the skip-stop plan, based upon the actual experience of a number of typical companies throughout the country. Additional copies of this bulletin will be sent to companies upon request.

*Increased Rates of Fare.* An up-to-date tabulation is maintained of all cities that have received increased rates of fare. These cities are classified in groups based upon the present rate of fare in effect. The tabulation shows the name of the city, the population served, the name of the operating company, the former rate of fare and the date when the present rate of fare became effective. The association has further prepared a statement showing the effect of increased rates of fare on operating revenues in a number of typical cities. This is based upon replies to letters sent out during the last month and represents the situation probably as well as it is possible to present it, in view of the many factors which have interfered with such comparisons, such as the influenza epidemic, the abnormal weather conditions last winter, the effect of war industries, thrift campaigns, etc.

*Taxes and Other State, Municipal and Federal Requirements Levied on Electric Railway Companies.* Data Sheet No. 182 is now being compiled by the association for the purpose of showing the extent to which



the electric railway industry is subjected to financial burdens as a result of the above requirements. The committee on readjustment, as a result of the resolution adopted at the New York conference on Nov. 1, expects to use this information in its effort to secure a readjustment of the relationship between the electric railway companies and public authorities. Member companies are urged to return the above data sheet filled in, at the earliest possible moment in order that the work of this committee may not be delayed.

### Summons Ordered for Waterbury (Conn.) Meeting

THE Waterbury local committee of the Connecticut Company section has issued a notice of the meeting to be held on March 27 in the following unique form:

TO THE HIGH SHERIFF OF ALL COUNTIES:

Greeting:

You are hereby ordered to summon each and every member of the Connecticut Company Section A. E. R. A. to appear at Hotel Elton, Waterbury, Thursday, March 27, 1919, at 6.30 p.m. to sit in judgment on such entertainment and speaking as may thereafter be provided.

Owner Judd of the Elton, in deep sympathy with the defendant committee, has agreed to furnish jurors from afar, attachés in Waterbury and all members of high or low degree, a dinner (price \$1.25) that is guaranteed to produce a feeling of instant appreciation and good-will.

#### SPEAKERS:

WILLIAM B. SANDLAND, *Mayor of Waterbury.*

C. A. TEMPLETON, *president of Board of Aldermen, State Senator.*

FREDERICK S. CHASE, *president Chase interests.*

JOHN H. CASSIDY, *secretary and treasurer, Waterbury & Milldale Tramway Company (Green Line).*

JOHN H. GOSS, *general superintendent, Scovill Manufacturing Company.*

Entertainment furnished in spasms.

Song Leader—ALVIN GILLETTE.

Reception committee on double time.

Therefore fail not under penalty of heavy losses in the things that make life worth living.

Faternally yours,

WATERBURY GENERAL COMMITTEE.

On March 20 the local committee sent out a 3-page follow-up letter containing well-written descriptions of points of interest along the route from New Haven. Attention was directed also to engineering and transportation features of the route. The letter contained reference to company incidents giving "local color" to the story and sufficient historical detail to render the document of considerable reference value.

The holding of this meeting in Waterbury is part of a general plan to secure the active participation of the company section members located away from New Haven, the headquarters of the company.

### Toledo Section Membership Passes 1100 Mark

MORE than 800 members attended the meeting of the Toledo joint section on March 4. At this meeting the announcement was made that 762 new members had been secured in a "drive" launched on Jan. 29. This brings the total membership to 1102, and F. R. Coates, president Toledo Railways & Light Company, announced that valuable prizes would be awarded to the five members bringing in the most new members prior to May 1. The program at the meeting was practically all of an entertainment character.

### I. E. R. A. Officers and Committeemen

THE complete list of officers and committees of the Illinois Electric Railways Association for the year 1919 is as follows:

**Officers:** President, W. C. Sparks; first vice-president, E. M. Walker; second vice-president, W. L. Arnold; secretary-treasurer, R. V. Prather.

**Executive Committee:** D. E. Parsons, chairman; Frank J. Baker, W. C. Sparks, H. E. Chubbuck, C. F. Handshy, Britton I. Budd, E. C. Faber, E. M. Walker, J. R. Blackhall, W. L. Arnold.

**Membership Committee:** Frank E. Johnson, chairman; E. H. Noyes, G. T. Seely.

**Electrical Engineering Committee:** E. S. Gillette, chairman; John Leisenring, Charles H. Jones, G. W. Welsh.

**Mechanical Engineering Committee:** H. A. Johnson, chairman; J. M. Bosenbury, John Sutherland.

**Way Committee:** John B. Tinnon, chairman; B. J. Fallon, H. F. Merker.

**Traffic Committee:** C. C. Shockley, chairman; R. Breckenridge, C. F. Speed, E. M. Walker.

**Safety Committee:** H. B. Adams, chairman; W. H. Heun, Joseph O'Hara, Dr. H. E. Fisher.

**Publicity Committee:** E. E. Soules, chairman; J. M. Strasser, H. E. Weeks, F. C. Eckman, R. H. Hayward, W. W. Crawford.

**Program Committee:** H. J. Kenfield, chairman; L. E. Gould, J. W. Busch, A. P. Jenks, W. V. Griffin, Lesley C. Paul.

### Ontario Safety League Active



#### Rear End Bumps

Sudden falls coming from apparently slight collisions have caused serious injuries to passengers. Therefore, when closely following another car. BE SURE YOUR CAR is under control. KNOW the rail condition. BE READY to stop instantly

You Cannot Tell How Unexpectedly  
the Car Ahead May Stop

Electric Railway Bulletin No. 82

Issued by ONTARIO SAFETY LEAGUE, Royal Bank Building, Toronto

These Bulletins are read each week by Thousands of Motormen and Conductors

(Illustration Courtesy of National Safety Council)

RECENT ONTARIO SAFETY BULLETIN

Ontario Department of Highways a safety card is issued with every automobile license issued by the Province, and the gummed seals are used by merchants and others on outgoing mail. They carry the message, "Be careful. Avoid accidents." The question of how interest can be maintained in the safety movement seems to have been satisfactorily settled by the League, of which J. F. H. Wyse is organizer and engineer.

The fifth annual report of the Ontario Safety League shows that during 1918 the League issued 2500 large cards for posting in street cars, 22,000 bulletins for posting in car-houses and shops and elsewhere, 110,000 cards to motorists, 100,000 letters to parents, 540,000 gummed seals, and other warnings.

Through the co-operation of the



# News of the Electric Railways

FINANCIAL AND CORPORATE • TRAFFIC AND TRANSPORTATION

PERSONAL MENTION

## New Jersey Strike Settled

**Company Will Treat Only with Bodies of Its Employees—Other Matters to Be Arbitrated**

Announcement that the joint conference board of the union and officials of the Public Service Railway, Newark, N. J., had accepted the proposed basis of settlement from the federal representatives was made on the afternoon of March 16 by Mr. Ogburn, who is in charge of the railway department of the War Labor Board. Immediately after giving out this information Mr. Ogburn left for Washington, where he reported the situation before the board.

Mr. Ogburn was designated by former President Taft, co-chairman of the War Labor Board, to settle the controversy, if possible, following the appearance before the board on March 14 of representatives of the railway and the union.

Mr. Ogburn arranged for a conference on the morning of March 15 with President Thomas N. McCarter and Edmund W. Wakelee, vice-president of the railway. It was at this conference that Mr. Ogburn and his colleagues submitted the proposed basis of settlement which was accepted by the company. They had previously met the representatives of the employees. In the afternoon the War Labor Board representatives offered the plan to the joint conference board of the men's union, and the board refused to accept the clause in the program submitted by the National War Labor Board's representative which provided that the question of putting into effect of the company's collective bargaining plan be referred to the War Labor Board. The men insisted that the collective bargaining plan be withdrawn, as President McCarter had offered to do on the evening before the strike was called.

On March 16 Mr. Ogburn returned from Washington with a slightly altered draft of the War Labor Board proposition, which the company accepted, and this was put up to representatives of the men on the afternoon of March 16. They promptly accepted it. It was submitted to the union locals on March 17 and approved.

### TERMS OF AGREEMENT

The terms, made public by Mr. Ogburn provide:

That any committee or joint conference board, composed of the employees of the Public Service Railway appointed at a meeting of any division of the Amalgamated Association of Street & Electric Railway Employees of America, shall have the right to deal with the officials of the company concerning any matter or matters in controversy. This does not negate the right of employees to treat with the company directly or through other committees.

It is understood that the company has withdrawn and abandoned its so-called co-operative or collective bargaining plan, recently promulgated.

Any other matters in controversy between the company and its employees may be referred by either party to the National War Labor Board for decision.

It also was provided that all men on strike should return to work upon acceptance of this proposition, and that the workers be reinstated in their old jobs. All matters of wages and conditions of work which were part of the union's demands may be placed before the War Labor Board for decision in the near future.

The principal bone of contention was recognition of the Amalgamated Association, and the withdrawal by the company officials of their collective bargaining plan. The men also asked for ten hours' pay for a nine-hour day.

Thomas N. McCarter, president of the railway, issued a statement declaring that although the agreement provides for recognition of committees of employees the company is supported in its refusal to sign contracts with the Amalgamated Association or any other union of employees.

John L. O'Toole, assistant to President McCarter, when informed that the strikers had interpreted the decision as a recognition of the union, is reported to have said:

We will only treat with bodies of our employees. They can call themselves anything they like.

## Mr. Shonts Discusses Port Problem

At a meeting of the Board of Trade & Transportation of New York on Feb. 26 to hear the report of the special committee which made a study of the proposed treaty between New York and New Jersey for joint control and improvement of the waters about New York, Theodore P. Shonts, president of the Interborough Rapid Transit Company, told of the urgent necessity of immediate action to keep clear at this port the channel of the commerce of the world. He declared the problem was one of congestion and advocated the co-ordination of all railroads and spoke in favor of a tunnel under the Hudson River. The situation demanded instant attention, he said, and added that it was not the result of planning, but that it simply grew.

He said that all the New Jersey railroads could be linked up as a solid unit and this done it would afford an economical method for the exchange of freight and would afford one clearing yard for all the boroughs of New York, for New England and for ocean cargoes.

## Buffalo Retains Prof. Richey

**Will Represent City on Board with James E. Allison to Draw Up New Operating Plan There**

Albert S. Richey, Worcester, Mass., professor of electric railway engineering in the Worcester Polytechnic Institute, has been chosen by the City Council of Buffalo, N. Y., as its representative on the board of arbitration which will formulate a plan whereby the International Railway, Buffalo, will be placed under municipal control. Mr. Richey will take the place of Peter Witt, Cleveland, Ohio, who declined to represent the city on the board. The conditions under which Professor Richey accepted this appointment are such that he is not obliged to be the partisan of the city, but can exercise his best judgment on all matters which may come up for decision. The International Railway's representative is James E. Allison, Jr., St. Louis, Mo.

### START ON AGREEMENT SOON

During his work in Buffalo, Mr. Richey will be paid at the rate of \$150 a day. As soon as the two arbiters agree upon the third member of the board the work of drawing up an agreement between the city and company will be started. The board must also agree upon certain intangible assets of the railway's city lines upon which a fair return will be allowed.

A new phase of the railway tangle in Buffalo developed during the week ended March 15 when a bill was introduced in the State Legislature at Albany giving the municipal authorities permission to enter into an agreement with the International Railway for a service-at-cost plan of operation and guaranteeing the company a fixed return upon its investment. The bill also provides for a compulsory reference of the measure to the voters before it becomes effective, even though it is approved by the Legislature. It is predicted the measure will be defeated. The bill has been approved by the City Council.

The City Council has rescinded its action allowing the International Railway to collect a 6-cent fare with a 1-cent rebate slip pending the determination by the Public Service Commission, Second District, of a just and reasonable rate of fare to be charged in Buffalo. The voters filed petitions and the referendum on the question was to have been held on March 25. The action of the Council rescinding its former action saves the cost of a second referendum, which would be close to \$40,000. It was generally conceded the action of the Council would be repealed by the voters.



## Ten-Year Grant Suggested

Mayor of Cleveland, Thwarted in Attempt to Extend Tayler Franchise for Year, Makes New Proposal

The Council of Cleveland, Ohio, on March 11 by a vote of twelve to twelve defeated the city administration's proposal for a year's extension of the Tayler grant to the Cleveland Railway pending a vote at the next election on municipal ownership and operation of the railway property.

On March 13 Mayor Davis, in a letter to City Council, proposed that an ordinance be enacted providing for a vote next fall on municipal ownership and operation of the Cleveland Railway property. The Mayor also suggested that Council immediately open negotiations with executives of the railway for a ten-year franchise containing better terms for the car riders than the present grant provides. The Mayor asserted that although, in his opinion, Council made a serious mistake in rejecting the proposed one-year franchise extension, it is imperative that the Tayler grant be extended. He suggested daily sessions of Council, the public and city officials with the railway executives until the railway problem is solved.

In a letter placing his proposal before Council the Mayor said in part:

I feel the present arrangement of private ownership with private operation and public control does not adequately protect the rights of car riders in many essential particulars, and I suggest and insist that the only proper remedy short of municipal ownership is municipal operation and that:

1. A franchise should be drafted and offered to the railway providing for a renewal of the franchise, providing for operation of the lines by the city with the present fixed return to the stockholders by way of rental with proper security given them for the maintenance of the property, and providing therein a separate arrangement by which extensions can be built as required by the needs of the city without the restrictions upon the same, as provided by the present grant.

2. (a) If the present scheme of private ownership and private operation is to be continued, which I deem inadvisable, I suggest and insist that a renewal of the franchise carry with it an incentive for economy of operation by the company, by providing for an increase in the stockholders' return for the period in which the company, by economical management, expends less than its operating allowance and its maintenance, depreciation and renewal allowances, and providing for a decrease in the return to the stockholders when the company over expends its allowances, said allowances to be fixed yearly by a budget system, but otherwise as provided in the present ordinance, thereby making the rate of return to the stockholders depend upon the rate of fare.

(b) If the present general plan is renewed, proper provision should be made in the extension franchise for the making of renewals adequate to promote the growth of the city, by a revision of section thirty of the present ordinance, which at the present time makes it almost impossible for the city to compel extensions in the undeveloped territory.

(c) Provision should also be made in the franchise to do away with the probability of future strikes on the system by providing that the city, in case of disputes between the company and its employees about working conditions, rates of wages, the class and conduct of employees (including grounds of discharge) shall be the final arbitrator, with proper provisions that the company's investment shall not thereby be impaired.

I would ask that each member make it his business to aid these negotiations by presenting the result of his experience and submitting amendments which he deems necessary in the interest of his constituents, to the end that the citizens of Cleveland may secure the best railway service.

On the eve of the negotiations for the renewal of the Tayler grant President Stanley of the Cleveland Railway issued a statement in which he said that while he agreed to the opening negotiations with the city, he was opposed to making any changes that would interfere with rights now held by the company and city. These, he defined, as the security of the company's investment and certainty of dividend, and the city's control of fare and service. According to Mr. Stanley Cleveland has enjoyed the lowest fare and the best service of any of the large American cities under the Tayler grant and this important fact should not be lost sight of in the negotiations.

Among the complaints against the ordinance raised by the city administration is lack of incentive for economy.

In a communication read before the Council on March 17, the Mayor expressed his conviction that Council made a mistake in rejecting his original proposal for a one-year extension of the Tayler grant pending a vote next fall on municipal ownership. He ended with the suggestion that Council should enact his ordinance for a vote next fall and then should proceed to negotiate with railway executives for a ten-year franchise, subject to the right of the electorate to vote at any time on municipal ownership.

A suggestion to meet the complaint of a lack of incentive for economy has come from Fred H. Goff, president of the Cleveland Trust Company, who proposed that the minimum dividend be limited to 6 per cent and that it shall rise as the fare is lowered beyond a certain point, at which the minimum return is to be paid.

## Official Acquitted in Brooklyn Accident Trial

After deliberating for four hours and eighteen minutes the jurors in the case of Thomas F. Blewitt, a division superintendent of the Brooklyn (N. Y.) Rapid Transit Company, indicted of manslaughter as a result of the Malbone Street wreck, on Nov. 1, in which more than ninety-five persons were killed and 200 injured, returned a verdict of not guilty in the Supreme Court, at Mineola, Long Island, on March 18. It was charged in the indictment that Blewitt had permitted an inexperienced motorman to take out the train.

The entire day was occupied by both sides in summing up. District Attorney Lewis of Kings severely arraigned the defendant, charging he had assigned men to run trains on the day of the accident who had never acted as motormen before.

A jury will now be drawn to try Anthony D. Lewis, the motorman, whose trial will be called next week. Following the disposal of this case, those of several other indicted officials of the company will probably come up. Lewis ran his train into the walls of a tunnel while acting as a motorman following a strike of the trainmen of the railroad.

## Detroit M. O. Vote April 7

Price of \$31,500,000 for Detroit United Lines Within City Goes Before Voters at Spring Election

Citizens of Detroit, Mich., will be asked to vote on April 7 whether they approve of the city acquiring the Detroit United Railway system within the 5-cent fare zone at a price of \$31,500,000. This was definitely decided at a recent joint meeting of the Street Railway Commission and the Common Council. If approved by the people the city will take possession of the railway system on July 1, 1919. The Common Council informally and in advance approved the financial plans of the Railway Commission for the acquisition of the properties.

### COMMISSION OUTLINES PLANS

These plans were outlined in a statement issued by the commission:

The city will pay \$15,000,000 in cash to the Detroit United Railway. The balance of the total sum will be made on the partial payment basis.

Interurban, freight and construction cars will continue to be operated by the Detroit United Railway, which is to recompense the city for the use of tracks, etc., on the basis of cost plus 30 per cent.

With the question of the acquisition of the railway system there also will be submitted to the people a proposition to issue public utility bonds to the amount of 2 per cent of the assessed valuation of the city. The sale of these bonds would realize in the neighborhood of \$27,000,000. Of this amount, \$15,000,000 will be used to make a cash payment to the railway.

The resolution already passed by the Common Council to submit to the voters a bond issue of \$10,000,000 for the purpose of piecemeal construction of a municipal system will be withdrawn, and extensions and betterments will be cared for from the proceeds of the one issue of public utility bonds.

Mayor Couzens is quoted as follows:

We are going to submit this price of \$31,500,000 to the voters at the next election. If the people want to get control of the lines at once, all right; if not, we are willing to go on with the fight if it is the wish of the people we do so.

It is the best we are able to do at the present time. The present situation is like the smallpox, only worse. The people would be willing to pay \$2,000,000 to get rid of the smallpox and have nothing but the fact they were rid of the disease to show for their money.

It is a question now of whether the city is willing to pay an extra \$2,000,000 and wipe the Detroit United Railway out as a problem.

The text of the agreement for the sale of the city lines to the municipality was signed by representatives of the city and the company on March 18. As previously stated, an initial payment of \$15,000,000 will be made on or about the first day of July and the balance of \$16,500,000 on Dec. 31, 1931, with interest at 6 per cent a year from the date of the payment of the \$15,000,000. In case the city is unable to make the initial payment of \$15,000,000 on July 1 the time is to be extended for not more than ninety days after July 1. After that further extensions are to be secured only by mutual agreement between the railway and the city.



## Ex-President Taft on Labor

**Explains Basis Upon Which War Labor Board Based Its Action in Making Wage Awards**

An unusually interesting speech was made by former President Taft in Atlanta, Ga., recently on the Proposed League of Nations. In the course of his remarks Mr. Taft discussed incidentally the problems of labor, and it is believed that he told for the first time the considerations that governed much of the work of the War Labor Board while he was a member of that body. For this reason the words of the ex-President are of special interest to electric railway representatives and to the employees of such companies. Mr. Taft is quoted in part as follows:

Perhaps you have a right to know why I should speak at a labor meeting. For nine months, as a member of the War Labor Board, I have been forced to study the question of the relations between capital and labor in this country.

The members of the board occupied three weeks in constant discussion, and after a while, to our own great surprise, and I think to the surprise of all twelve of the commission, we agreed and signed the paper.

Now, that paper contained a number of principles. One was that no employer had the right to interfere with the complete right of the laborers to organize into trades unions, to be represented in their dealings with their employers by committees of their own; that no working men had a right to interfere with the organizations of employers, and that we approved in the strongest possible way the principle of collective bargaining and of the group system.

And upon that basis we laid down other principles and created machinery by which we took up the differences that might arise between the employers and employees during the war.

The laborers of the world have acquired a greater consciousness of power, and it is for the benefit of the community that the trades unions should be encouraged and recognized and dealt with on the principles of the group system. This will give to the leaders of labor a sense of responsibility and a conservatism that they will not have if employers occupy an attitude of hostility. Unless this is done labor will be driven into hostility and into being reds and radicals, and you will encourage that anarchistic, socialistic spirit that is rife now the world over.

It is essential that the laboring men should acquire a sense of responsibility to society; that the business men who employ should recognize them and deal with them, and come together with them in collective bargaining, so that differences shall be removed.

We have increased wages often and then we have recognized in connection with the increases the necessity especially in public utilities of increasing rates of fare, so that the companies may have the means by which they can pay that rate of wages and other expenses.

That has been done right here in Atlanta and in New Orleans and elsewhere, and the character of the relation is such that if you welcome the organization of labor and put it in a position of responsibility, they ought to feel the obligation to help their employers get what is just for them, because it is not the square thing to get an increase in wages and then ignore the other part of the recommendation of the decree, namely; that the rates of fare also be increased to meet these additional expenses involved in excess costs and higher prices of everything which should be met in some way in order to increase the revenue of the street railway.

### New Wage Scale at Wheeling

At a meeting of the Street Railway Men's Local No. 108, embracing the entire Wheeling district, a new wage scale was adopted, as drawn up by the executive board of the organization. The new scale asks for 55, 60

and 65 cents an hour and time and a half for overtime for all motormen and conductors, and a proportionate increase over the old scale for all carhouse men and for women. The present scale is 38, 40 and 45 cents an hour, according to the length of service. It has been stated that the other new working terms are practically the same as the present ones.

The new scale will be submitted to the local railways at once and, if approved, it will become effective on May 1. The union embraces all the Wheeling lines, those in adjacent sections up the Ohio River as far as Steubenville and all lines in the Bellaire, Bridgeport and Martins Ferry section of eastern Ohio. The agreement affects about 500 men and a score or more of women, the latter being employed principally as car cleaners at the carhouses.

### Scranton Men Will Ask More

Employees of the Scranton (Pa.) Railway, numbering more than 500 conductors, motormen, track men and barn men, have framed demands for an increase in wages after April 1 of 15 cents an hour. Also, the union is demanding that conductors and motormen shall have every eighth day off and other changes in the present agreement. They request a one-year agreement.

Conductors and motormen are now receiving 41, 43 and 45 cents an hour, this scale having been awarded them by the War Labor Board, following the strike last summer. The demands of the men are for increases to 56, 58 and 60 cents an hour.

The War Labor Board award dates from June 2, 1918, and it provides that "this scale shall prevail during the duration of the war but after Feb. 1, 1919, it may be opened at periodical intervals of six months for the making of adjustments as may be deemed necessary." The present agreement between the union and the company was signed on April 1, 1916, and expires April 1, 1919.

Officers of the union say that they are taking the stand that the war is over and that the War Labor Board award must be superseded after April 1 by a new agreement made between the workers and the company.

### Women Again the Issue

Arguments in the appeal from the recommendation of the National War Labor Board that women conductors at Cleveland, Ohio, be discharged to satisfy demands of striking male employees were heard on March 13 by the board. The case was taken under advisement.

Dr. Anna Howard Shaw, honorary president of the National American Woman Suffrage Association; Frank P. Walsh, former joint chairman of the board, and Miss Mary Van Kleeck, director of the women-in-industry service of the labor department, were among those who appeared in behalf of

the discharged women workers, while James H. Vahey, attorney for the Amalgamated Association of Street & Electric Railway Employees, opposed the appeal.

Dr. Shaw declared that during the war women in all parts of the country had responded nobly to the nation's call for workers, but now that the acute need for workers had passed, there was a tendency to "get rid of" the women. Dr. Shaw said:

Men employees demand it, and because they are organized, they have power to enforce their demands. The worst of it is that many of the men so employed were never in the military service, but had left to enter "safe" employment.

Mr. Walsh said the board should declare that women were legally entitled to the same rights in industry as men. The women conductors of Cleveland were unjustly discharged, he said, and should be reinstated.

Miss Van Kleeck told the board that women's claim of freedom to choose occupations was the greatest labor issue before the country.

Mr. Vahey argued that the board was not legally empowered to order the re-employment of the women conductors, since its jurisdiction extended only to cases where labor disputes between employees and employers threatened to result in a strike.

### B. R. T.'s Labor Policy Stated

Lindley M. Garrison, receiver of the Brooklyn (N. Y.) Rapid Transit Company, has expressed a willingness to recognize the right of the men to organize, but he has made it plain that the company will deal only with its own employees. In the current issue of the *B. R. T. Monthly* Mr. Garrison writes:

No attempt will be made to prevent any employee from joining any organization that he pleases. On the other hand the management of the system will, as heretofore, deal with the committees of its own employees in all matters affecting the relation of its employees to the system.

The purpose in addressing the employees, in view of the recent newspaper publicity given to the most recent ruling of the War Labor Board, is to indicate the position of the system under its present management and to prevent any misunderstanding in respect thereto.

The Amalgamated Association is at present engaged in an effort to organize the trainmen in Brooklyn into a local under its domination.

At a recent labor meeting in Brooklyn a tentative draft was read of the conditions and suggestions that are to be taken up with the company. It calls for a better working understanding and a board of arbitration representing the workers and the company. Section 5 of the temporary preamble calls for an eight-hour day for all conductors, ticket agents and station men, and demands that all work in excess shall be overtime, and shall be paid for at the rate of time and a half. It is also demanded that the company pay all extra men who answer to the rollcall at the rate of \$21 a week. The proposed agreement will also stipulate that entries shall not be placed against an employee without the opportunity of a hearing to answer the charge.



### The Proper Spirit

The electric railways were in the vanguard of those employers who announced that places were open to all men who entered the service of the government during the war. The instances of the large companies that did this are many. Public recognition in their cases has been freely given. The smaller companies, however, have been no less active in the interest of their men returning from the front. Their work, too, has attracted much attention and been commented on favorably. One of the more recent instances among the smaller companies is that of the Hot Springs (Ark.) Street Railway. Here is what the *New Era* of that city said under "The Proper Spirit" on Feb. 21:

Of course all corporations are soulless. And this especially applies to public utility corporations. But there is one particular corporation of which we know that seems to have risen to the "Great Idea," and in a manner that would indicate that one corporation is at least part human, and possesses some modicum of soul.

This is our own Hot Springs Public Utility Company. When the big doings started over in Europe many of their men promptly volunteered while others were taken by the selective service plan. No objection was made to their departure—in fact they were encouraged. Neither was any promise made as to holding their jobs for them, but every man that has returned has stepped into his old job.

The street railway has put ten of its men back to work, with all the rights, seniority and increased pay that they would have secured by remaining at home.

The paper named the men at the conclusion of its editorial.

### N. E. L. A. Deprecates Advocacy of Municipal Ownership

Public ownership is discussed in the interim report of the public policy committee of the National Electric Light Association. Among the members of the committee are H. G. Bradley, Walton Clark, H. L. Doherty and Samuel Insull. In referring to the electric railways the committee says:

Prominence has been given in recent months, and is likely to increase, with regard to the financial condition of the electric railways throughout the country.

In the stress of conditions above outlined, it has been suggested in some quarters that the most practicable and effective solution of the electric railway problem is in municipal ownership since, if the municipalities should acquire the electric railways, the additional revenue required would be forthcoming either through increased fares or indirectly through taxation.

We recognize the extremity of the railway companies and the advantage that such suggestion may offer to some of them individually, but we deem it necessary to say that the opinion of your public policy committee, as hitherto frequently expressed, continues with increasing conviction that municipal ownership of electric lighting, gas and electric railway companies is economically unsound and cannot redound to the mutual benefit of the consumers and the municipality. We think it is only fair publicly to reaffirm our views upon this subject at this time when temptation to the encouragement of municipal ownership by utilities companies themselves seems apparent.

### Urges Franchise Forfeiture

Urging that the city of Birmingham, Ala., institute quo warranto proceedings in the courts seeking to have the franchise of the Birmingham Railway, Light & Power Company forfeited to the city, a statement has been issued

by the public utilities committee of the Birmingham Civic Association. The statement urged that the city institute the proceedings before properties pass into the hands of a reorganization committee in the course of the present receivership proceedings.

The statement issued by the committee deals with a statement previously issued by Forney Johnston, special attorney for the city, in which he said that he had evidence on which a forfeiture of the franchise could be asked. In his statement Mr. Johnston suggested that satisfactory terms could probably be made by the city with the receiver and a re-organization committee.

The committee of the Civic Association in its statement asks that litigation be started in an effort to revoke the franchise and points out that in the event the franchise is revoked the city will be in a position to dictate terms and arrange, if it is desired, for the purchase of the property.

## News Notes

**Sioux City Men Want More.**—Employees of the Sioux City (Ia.) Traction Company have petitioned the company for an increase of 15 cents an hour effective on May 1. The men are now receiving 30 and 35 cents an hour.

**Railway Brotherhood Again Active.**—A movement is under way in Terre Haute, Ind., asking organized labor in that city to support a demand of the trainmen of the Terre Haute, Indianapolis & Eastern Traction Company that the company recognize the Order of Railway Conductors and the Brotherhood of Locomotive Engineers as the official unions of traction conductors and motormen.

**Labor Department Commends St. Louis Company.**—The United States Department of Labor at Washington has commended the United Railways, St. Louis, Mo., for the co-operation of the company in taking back men, with seniority pay, who served during the war in the army, navy and marine corps. The Labor Department was informed of the United Railways co-operation by Frederick B. Dolan, special agent of the department, who forwarded to Washington a card which the railway is displaying in vestibules of 1300 cars.

**Municipal Ownership Bill in Missouri.**—A series of four bills and two joint and concurrent resolutions submitting constitutional amendments permitting St. Louis, Mo., to own and operate electric railroads and terminals and providing the machinery for condemning property for such purposes have been introduced

in the House of Representatives by Representative Davidson of St. Louis. One measure provides that cities of more than 500,000 are "hereby given the power to build and operate street railroads, terminal railroads and railroads of all other descriptions."

**Rights Waived to Hasten Purchase.**—To facilitate the closing of the deal for the purchase of the railway lines of the Puget Sound Traction, Light & Power Company in Seattle, Wash., by the city all parties to the recent "friendly" action against the city in the State Supreme Court, to test the validity of the deal, have agreed to waive their statutory rights, and consent to an immediate closing of the transaction. The law provides that the plaintiffs have thirty days from the date the Supreme Court upheld the city's right to buy the Seattle railway system to file a motion for rehearing.

**St. Louis Men to Ask More.**—Motormen and conductors of Division No. 738 of the Amalgamated Association at St. Louis, Mo., have voted unanimously to open their contract with the United Railways on April 1 and demand a new wage scale of 60 cents and 65 cents an hour and the basic eight-hour day. The present wage is 36 cents and 42 cents an hour, based on nine hours for the day's work. This wage was fixed at the conclusion of the strike, in February, 1918, and the contract entered into was for three years, dating from June 1, 1918, with the privilege of reopening the matter for the adjustment of wages and hours.

**New Jersey Tunnel Bill Defeated.**—The Upper House of the Legislature of New Jersey on March 18 defeated the bill of Senator Edwards of Hudson, providing for a thirty-five-year bond issue of \$12,000,000 toward the construction of the proposed vehicular tunnel under the Hudson River from Jersey City to New York and a bridge over the Delaware from Camden to Philadelphia. It is possible the matter will now be taken up by referendum. New York and New Jersey had already made preliminary appropriations. The Public Service Corporation of New Jersey had made extensive studies of the matter on its own account at considerable expense to itself.

**No Funds for Paving.**—Charles L. Kurtz, president of the Columbus Railway, Power & Light Company, Columbus, Ohio, recently sent a communication to Director of Public Service Bordon in which he stated that it will be impossible for the company to co-operate with the city this spring in paving portions of Broad, Main and Fourth Streets, because of a lack of funds for the purpose. He expressed a willingness to bear a portion of the expense when the company is financially able to do so. The letter called attention to the fact that legislation is pending in the City Council for an increase in the rate of fare and that this may afford sufficient relief for the company to pave its portion of the streets at some fu-



ture time. The city engineer has advised against paving the city's portion of the streets until the company can take care of the remainder.

**Another Attempt to Curb Commission.**—Measures designed to curtail the jurisdiction of the Public Service Commission of Missouri and to give to the cities control of the public utilities which operate within the municipalities have been reported unfavorably by the House judiciary committee. In December representatives of towns and cities met in Kansas City and agreed to take concerted action to curb the powers of the commission in retaliation for decisions considered by city representatives as inimical to their best interests. Later two bills along these lines were approved by representatives of the municipalities, and delegations from Kansas City and other towns and cities appeared before the judiciary committee urging that the measures be approved. The bills have been reported unfavorably and the matter of curtailing the power of the commission will probably be dropped.

**Labor Board Jurisdiction Denied.**—The Louisville & Northern Railway & Lighting Company and the Louisville & Southern Indiana Traction Company, New Albany, Ind., through the president, Harry L. Reid, has refused to recognize the jurisdiction of the War Labor Board in settling the wage grievances of employees. This announcement was made when employees of the companies met with representatives of the War Labor Board to present their grievances. Men employees on the lines receive a wage scale ranging from 31½ cents an hour to 36½ cents an hour. The motormen and conductors on the lines running between Louisville and New Albany, and Louisville and Jeffersonville receive from 34 cents to the maximum of 39 cents an hour. The men contended that they were unable to live properly on these wages and requested the War Labor Board to grant them an increase. The exact rate of increase is not set forth.

**No Enthusiasm for Local Ownership.**—The committee of twelve representative business men and taxpayers headed by W. E. Massey, Ocean City, N. J., appointed some weeks ago to look into the feasibility of raising subscriptions to purchase the Ocean City Electric Railway, made its report at a recent meeting. The committee said it was difficult to interest a sufficient number of property owners to raise the \$84,000 necessary, and recommended that the road be operated through the co-operation of the city. The taxpayers at the meeting said that the electric railway must be in operation during the coming season. The committee, the city commissioners and representatives of the bondholders of the railway will hold another meeting when an effort will be made to arrange with the company to operate the road under a guarantee from the city to make up any deficit. It is thought the road will lose not more than \$4,000 for the season.

**\$1,000,000 for Grade Crossing Removal.**—The Public Service Commission for the First District of New York has asked the Legislature to make an appropriation of \$250,000 to be applied toward the removal of dangerous grade crossings in the Borough of Queens. The twenty-one grade crossings referred to are on the Atlantic Avenue electric division of the Long Island Railroad between East New York and Jamaica. The appropriation of \$250,000 by the State will make available \$1,000,000 to be applied to this project, as the State's appropriation under the grade crossings law must be met by a like sum from the city and twice as much by the railroad company. With \$1,000,000 available the work can be begun and advanced substantially before an additional appropriation will be required.

**General Harries Before Supreme War Council.**—Brig.-Gen. George H. Harries, commander of the American military force at Berlin, has been at Paris for several days to appear before the Supreme War Council to render a report on the military and economic situation at the German capital and throughout Germany. He has given an account of events in Berlin during the last three months, culminating in the serious street fighting of the last fortnight. When the American party left Berlin, the Government forces under Gustave Noske, the German War Minister, had the upper hand and, in General Harries' opinion, the government will control the situation, particularly if food is sent to aid in holding back the Bolshevik menace from the eastern border. It will be recalled that General Harries, who is a former president of the American Electric Railway Association, was reported some few weeks ago to have had a narrow escape from serious injury during the street fighting in Berlin in which the Spartacides participated.

**Franchise Controversy in Bellaire.**—The City Council of Bellaire and the Wheeling (W. Va.) Traction Company are engaged in a battle which is attracting considerable attention throughout West Virginia. Some time ago the franchise of the company to operate cars through Bellaire expired, and no agreement on a new franchise having been reached the city decided to charge the company \$20 a day for the use of the streets. A bill of upwards of \$7,000 has accumulated under the order and an effort is to be made to collect it. Superintendent Billings of the railway has announced that the company intends to ask permission to establish a 10-cent fare between Bellaire and Wheeling, the 5-cent fare limit to be at Stop 9, West Wheeling. The superintendent has also stated that if Bellaire insists on the company paying \$300 a mile rental for the use of the city streets by the company, the company would discontinue operating cars in the city rather than establish the precedent of paying the franchise rental.

## Programs of Meetings

### New England Street Railway Club

The nineteenth annual meeting and dinner of the New England Street Railway Club will be held at the Copley-Plaza Hotel, Boston, Mass., on March 27. The annual meeting will be held at 3 p.m., and the dinner at 6 p.m. The speakers at the dinner will be:

Calvin Coolidge, Governor of Massachusetts.

Andrew J. Peters, Mayor of Boston.  
James E. Watson, United States Senator from Indiana.

R. W. Perkins, president of the club, will preside.

The tickets to the dinner will be \$5 each. Applications, accompanied by cash, money order or check, should be made promptly to George W. Knowlton, secretary of the club, or to Fred F. Stockwell, chairman of the banquet committee.

### Pacific Claim Agents' Association

At a meeting of the executive committee of the Pacific Claim Agents' Association held in Portland, Ore., on March 1, it was decided to hold the next meeting of the association on June 19, 20 and 21 in Oakland, Cal. The following papers are to be discussed:

JUNE 19

"The Psychology of Claims Adjustments," by J. H. Handlon, claim agent of the United Railroads, San Francisco, Cal.

"The Claimant, the Claim Department and the Physician and Surgeon," by F. J. Lonergan, attorney for the Portland Railway, Light & Power Company, Portland, Ore.

"Motor Vehicle Accident Investigation and Adjustment," by S. A. Bishop, claim agent of the Pacific Electric Railway, Los Angeles, Cal., and V. Laursen, solicitor of the British Columbia Electric Railway, Ltd., Vancouver, B. C.

JUNE 20

"The Safety Problem":

(a) "Of the Companies," by Thomas G. Aston, claim agent of the Washington Water Power Company, Spokane, Wash.

(b) "Of the Public," by Sergeant Lewis of Portland Police Traffic Bureau, Portland, Ore.

Written discussion by Charles A. Blackburn, claim agent of the Butte (Mont.) Electric Railway, Butte, Mont.

"Office Kinks in Claim Departments," by Thomas A. Cole, claim agent of the Los Angeles (Cal.) Railway Corporation.

"How to Handle Fraudulent Claims and Actions Having No Merit," by Frank D. Oakley, attorney for the Tacoma Railway & Power Company, Tacoma, Wash.

"Benefits of the Pacific Claim Agents' Association," by B. F. Boynton, claim agent of the Portland Railway, Light & Power Company, Portland, Ore.

The morning session on June 21 will be devoted to an open discussion of claim department problems.



# Financial and Corporate

## Union Traction Net Falls

Increase in Operating Costs in 1918  
Outweighs the Gain in Revenues,  
Cut by Jitney Competition

The annual report of the Union Traction Company of Indiana, Anderson, Ind., shows a deficit of \$98,542 in net income of the company for 1918. This was caused principally by a decrease in business and an increase of 10 per cent in the cost of operation.

The revenue from operation for 1918 was \$3,198,820, and the operating expenses \$2,236,487. While the operating revenue in 1918 was 4.32 per cent greater than in 1917, the operating expenses were 10.52 per cent greater than in the year previous. The net operating revenue suffered a loss of 7.42 per cent.

For the year 1918, after a deduction of sinking funds, the deficit amounted to \$98,542 as compared with a net of \$42,142 in 1917. Officials of the company report that the business outlook has improved since Jan. 10.

A total of 16,597,199 passengers were carried on interurban and city lines in 1918, which was 3,086,077 fewer than in 1917. The inroad made by the jitney bus traffic was demonstrated by the fact that the company carried 7,402,744 passengers on its city lines in 1918, as compared with 8,375,460 in 1917.

Detailed financial and statistical statements for the last two calendar years are given in the accompanying statements.

## Sufferings of St. Louis

Percentage of Increase in Operating Expenses Five Times That in Passenger Revenue

Although the passenger revenue of the United Railways, St. Louis, Mo., for the calendar year 1918 increased \$507,806, or 3.90 per cent, owing to the fare increase on June 1, the current operat-

during seven months of the year, showed only a 10.32 per cent increase in revenues, while the decrease in the number of passengers was 7.82 per cent. The total number of passengers carried during 1918 was 376,985,727, or 26,314,969 passengers less than the previous year. The passengers in 1918 averaged 8.90 per car-mile as compared with 9.17 per car-mile in 1917. The

COMPARATIVE INCOME STATEMENT OF UNITED RAILWAYS OF ST. LOUIS FOR YEARS ENDED DEC. 31, 1917 AND 1918

	1918		1917	
	Amount	Per Cent	Amount	Per Cent
Revenue from transportation.....	\$13,551,542	99.4	\$13,038,622	99.3
Revenue from other railway operations.....	88,077	0.6	86,937	0.7
Gross operating revenue.....	\$13,639,619	100.0	\$13,125,559	100.0
Current operating expenses.....	\$9,126,514	66.9	\$7,625,827	58.1
Depreciation.....	1,636,754	12.0	1,575,067	12.0
Taxes.....	852,476	6.3	853,161	6.5
Total.....	\$11,615,744	85.2	\$10,054,055	76.6
Income from operation.....	\$2,023,875	14.8	\$3,071,504	23.4
Non-operating income.....	116,698	0.9	94,702	0.7
Gross income.....	\$2,140,573	15.7	\$3,166,206	24.1
Interest and miscellaneous charges.....	2,540,872	18.6	2,523,230	19.2
Net income.....	\$400,299	†2.9	\$642,976	4.9
†Deficit				

ing expenses rose \$1,500,685, or 19.68 per cent. The passenger revenue for the first five months of the year decreased 4.57 per cent, while for the last seven months' period of 6-cent fare it increased 9.82 per cent. The large increases in expenses became effective in June. The amount paid out in wages in 1918 was 42.61 per cent of the gross operating revenue.

The operating expenses for 1918 showed the following increases as compared with 1917:

Way and structures.....	\$66,982	9.50%
Equipment.....	248,982	24.61%
Power.....	31,341	2.11%
Conducting transportation.....	974,230	31.69%
General and miscellaneous.....	179,149	13.27%
Total.....	\$1,500,685	19.68%

The increase in operating expenses was caused by the increase in wages amounting to 35 per cent, effective March 1, 1918, and an increase in the price of all material used in the operation and maintenance of the property. Operating expenses (including depreciation) increased \$1,562,372, or 16.98 per cent.

The interest charges increased \$17,641, or 0.69 per cent, and the result for the year suffered a loss from a net income of \$642,976 in 1917 to a deficit of \$400,299 for 1918.

The loss in earnings during the strike period in February was approximately \$185,000. The back wages paid employees amounted to \$349,800, which was paid out of the 5-cent fare effective until June 1.

The 6-cent fare, which was in effect

percentage of passengers using transfers was 53.32 per cent, and the average fare per passenger was 3.59 cents.

INCOME STATEMENT OF UNION TRACTION COMPANY OF INDIANA FOR YEARS ENDED DEC. 31, 1917 AND 1918

	1918		1917	
	Amount	Per Cent	Amount	Per Cent
Revenue from transportation:				
Passenger.....	\$2,577,556	80.54	\$2,588,176	84.40
Baggage.....	7,703	00.25	8,966	00.29
Parlor, chair and special car.....	2,215	00.07	7,787	00.52
Mail.....	2,744	00.09	1,836	00.05
Express.....	111,912	03.50	107,330	03.50
Milk.....	16,190	00.51	15,011	00.48
Freight.....	404,333	12.65	262,721	08.59
Switching.....	72	.....	.....	.....
Total.....	\$3,122,725	97.61	\$2,991,830	97.56
Revenue from operation other than transportation.....	76,095	2.39	74,636	02.44
Operating revenues.....	\$3,198,820	100.00	\$3,066,466	100.00
Way and structures.....	\$430,992	13.47	\$366,641	11.95
Equipment.....	282,691	08.84	227,902	07.46
Power.....	570,907	17.85	496,420	16.18
Conducting transportation.....	592,216	18.51	547,091	17.84
Traffic.....	8,807	00.28	16,218	00.52
General and miscellaneous.....	350,874	10.96	369,334	12.04
Total.....	\$2,236,487	69.91	\$2,023,609	65.99
Net operating revenue.....	\$962,333	30.09	\$1,042,857	34.01
Taxes.....	138,909	04.34	142,589	04.65
Operating income.....	\$823,424	25.75	\$900,268	29.36
Other income.....	21,627	0.67	16,531	0.54
Gross income.....	\$845,051	26.42	\$916,799	29.90
Deductions.....	943,593	29.50	874,657	28.52
Net income.....	\$†98,542	03.08	\$42,142	01.38
†Deficit				

COMPARATIVE STATISTICS FOR YEARS ENDED DEC. 31, 1917 AND 1918

	1918	1917
Passengers carried, interurban lines.....	9,194,455	11,307,816
Passengers carried, city lines.....	7,402,744	8,375,460
Total passengers carried.....	16,597,199	19,683,276
Freight handled (tons).....	110,613	100,234
Express handled, exclusive of Wells, Fargo & Company Express (tons).....	8,821	7,816
Mileage of cars, interurban lines.....	6,288,345	6,915,933
Mileage of cars, city lines.....	1,494,056	1,675,822
Total mileage of cars.....	7,782,401	8,590,755
Coal consumed at all plants (tons).....	114,646	120,045
Power generated (a.c.) at all plants (kw.-hr.).....	44,786,500	50,397,180
Power generated (d.c.) at all plants (kw.-hr.).....	26,094,237	28,591,247



## Receiver for New York Railways

Company Operating Many Surface Lines in Manhattan Borough Succumbs Under War-Time Burdens

Job E. Hedges, lawyer, noted after-dinner speaker, and one-time Republican candidate for Governor, was appointed receiver of the New York (N. Y.) Railways on March 20 by United States Judge Mayer. The petition was presented by the American Brake Shoe & Foundry Company, which is a creditor to the amount of \$36,806. An answer filed by the railway at the same time that the petition was presented admitted all the allegations made in the complaint. The concurrence of the defendant in the action makes the transfer of the railroad property to the court a friendly proceeding.

Theodore P. Shonts, president of the railway, when asked how the receivership would affect the Interborough Consolidated Corporation and the Interborough Rapid Transit Company, declined to comment except to make it clear that only the New York Railways had been put in the hands of the court.

The New York Railways has been in financial straits for some time. The recent failure of the directors to declare a dividend on Interborough Rapid Transit Company stock aroused interest in the Interborough Consolidated, the holding company which has interest to pay on April 1 on Interborough-Metropolitan bonds. The holding company has depended almost entirely in the past for its income on the dividends paid on the stock of the Interborough Rapid Transit Company.

The allegations contained in the papers filed in court followed the line of statements issued by Mr. Shonts in the last eighteen months. They speak of the threatened disintegration of the property through lack of income to meet pressing obligations, the danger that inefficiency in operation resulting from lack of money and of borrowing capacity will embarrass the public, that a complete cessation of operation may be brought about, and that if many suits for debts were instituted the property might be entirely destroyed. The petition speaks thus of the earnings of the company:

For the fiscal year ended June 30, 1918, the results from operation of defendant's system were such that the income was \$153,633 less than the amount required to pay the interest on the first real estate and refunding mortgage 4 per cent bonds; that for the second six months of 1918, the defendant's income of the period was \$738,187 less than the amount sufficient to pay such interest; that on Dec. 31, 1918, defendant's corporate deficit was \$2,125,039; that all of the defendant's special and reserve funds have been exhausted and that the defendant has not sufficient credit to obtain the moneys requisite for the operation of its property.

In its answer to the complaint the railways admitted all of the allegations and joined in the prayer for the appointment of a receiver in order to preserve the system "as it has been maintained and operated," and particularly to preserve the "franchises, privileges, and property" and its corporate existence and the real and personal

property. The petition makes no mention of any value set upon the property beyond stating the amount of the capital stock.

Mr. Hedges' appointment is temporary. At a hearing to be held on March 31 the appointment will doubtless be made permanent.

The New York Times says that Travis H. Whitney, acting chairman of the Public Service Commission, in discussing the receivership said that as the floating debts of the company amounted to \$1,600,000 the receivership was inevitable. Asked what the value of the company's plant was he replied that the most recent statement of figures placed it at \$65,000,000 in normal times and \$85,000,000 at war-time prices. Mr. Whitney was quoted as follows:

I shall be glad to co-operate in any way possible to insure a continuation of the service so that the public will not be inconvenienced. I hope the receiver will be able to handle the property so as to avoid a separation of the various lines, which would result in additional fares through the abolishment of transfers. The situation has been so serious that there was really no way out but to apply to the courts for relief.

Francis Sisson, vice-president of the Guaranty Trust Company, gave an interview to the Sun on March 19 which clarifies some of the questions at issue in connection with the inter-corporate relations of the New York companies and their need for more revenue. He also went over much of the ground covered by him in his address before the American Electric Railway Association at the meeting on March 14.

## Oakland Valuation Planned

Following the plan outlined by the advisory board named by the City Council of Oakland, Cal., to take up the matter of the purchase by the city of the properties of the San Francisco-Oakland Terminal Railways, there was filed with the Railroad Commission of California on March 11 by the city attorney of Oakland, a request that the commission place a value upon the properties involved, which consist of the entire holdings of the company as they existed on Sept. 24, 1918, the date of the company's second application for a resettlement franchise. The original application was filed on Feb. 28, 1917. With the present request is filed a stipulation by the railway in which it agrees not to urge in the valuation proceedings the use of higher unit prices resulting from increases in the price of labor and materials occurring between the applications; also an agreement to reimburse the city of Oakland for the expense entailed by the valuation proceedings.

The application involves sixty-nine franchises in Oakland. The earliest franchise was issued in 1883 to the Oakland Railway. The sale will include all franchises held by the company in the city of Oakland except the suburban and interurban railroad franchises which were granted to the San Francisco, Oakland & San Jose Consolidated Railway and are used in connection with the ferry system.

## \$1,403,585 Is St. Louis Estimate of Year's Loss

A report submitted to the Public Service Commission of Missouri by the United Railways, St. Louis, Mo., for January shows that although fares have increased 20 per cent the passenger revenue increase is only 11.52 per cent for the eight months the 6-cent fare has been in operation. During the same period the number of revenue passengers has decreased 6.51 per cent. The communication of the railway to the commission follows in part:

Complying with your order of May 15, 1918, we are hereby transmitting our operating report for January, 1919.

We also inclose—

(a) A table of statistics showing that for the eight months during which the 6-cent fare has been collected on city lines, the passenger revenue has increased 11.52 per cent, although the increase in fare was 20 per cent, and during this period the number of revenue passengers on city lines has decreased 6.51 per cent.

(b) An estimate of the results of a year's operation under the 6-cent fare, based on the actual results of the eight months' operation, showing that for the year ending May 31, 1919:

1. The city lines will show a deficit of \$495,285 in earning 6 per cent on a valuation of \$52,800,000.

2. The county lines will show a deficit of \$708,300 in earning 6 per cent on a valuation of \$7,200,000.

3. The combined system of city and county lines will show a deficit of \$1,403,585 in earning 6 per cent on a valuation of \$60,000,000, which was the tentative valuation adopted in your order of May 15, 1918.

We are submitting these figures so that your honorable commission may fully understand the situation.

## Six New Directors at Dallas

The annual meeting of the directors of the Dallas (Texas) Railway was held in Dallas during the week ended March 15 for the election of officers and the transaction of other business. According to a statement given out from the office of President J. F. Strickland following the meeting, the poor showing which the company is making in financial returns and how to improve these conditions and increase the earnings were the most important matters considered. It was said that no line of action was determined on.

The program of improvements for 1919 under which \$1,250,000 must be spent also was discussed. The company is not yet ready to announce all the new improvements to be made to comply with its franchise provisions for which it is bonded to the city.

Six new directors were elected as follows: La Monte Daniels, Charles F. Weiland, John V. Hughes, W. B. Head, C. E. Calder and G. A. Trumbull. The following directors were re-elected: Fred E. Johnston, J. C. Duke, M. L. Morris, W. R. Ellis, C. W. Hobson, H. A. Olmsted, J. H. McDonough, J. F. Strickland, J. K. Hexter, S. W. King, Jr., R. D. Suddarth, Orville Thorp, M. B. Shannon, W. S. Mosher and F. R. Bissell. Officers were elected as follows: C. W. Hobson, chairman of Board; J. F. Strickland, president; J. C. Duke, W. B. Head, C. E. Calder and Richard Meriwether, vice-presidents; J. B. Walker, secretary and treasurer; C. L. Cox, J. C. Thompson and W. R. Burns, assistants to the secretary and treasurer.



## Financial News Notes

**Dividend Action Put Off.**—No action was taken in regard to the declaration of a dividend by the directors of the Toronto (Ont.) Railway at the meeting on March 11.

**Receiver for Philadelphia Railways.**—Judge Rogers in the Common Pleas Court No. 2 at Philadelphia, Pa., on March 13 appointed Murdock Kendrick as temporary receiver of the Philadelphia Railways. A further hearing will be held on April 15 to decide whether or not the receivership shall be made permanent.

**Buffalo-Lockport Line Sold.**—The property of the Buffalo, Lockport & Rochester Railway, Rochester, N. Y., was sold under foreclosure at Rochester on March 12 for \$500,000 to W. A. Matson and W. W. Foster, Rochester, representing the bondholders. The plans for the reorganization of the company have been reviewed previously in the *ELECTRIC RAILWAY JOURNAL*.

**Service Resumed in Natchez.**—Electric railway service at Natchez, Miss., has been resumed after a suspension on all but one line for three months. It was stated by the Southern Railway & Light Company, owners of the system, that the suspension was made in order that repairs on track and equipment could be made. With the resumption of service the transfer system is eliminated but the old fare of 5 cents is retained.

**New Jersey Company Increases Dividend.**—The Public Service Corporation of New Jersey, Newark, N. J., has declared a quarterly dividend of  $1\frac{1}{2}$  per cent on the common stock, payable on March 31 to stock of record of March 28. The last two quarterly disbursements were of 1 per cent each, while two previous quarterly payments were 2 per cent, making a total of 6 per cent paid during 1918. A monthly dividend of  $\frac{1}{3}$  of 1 per cent was declared on the new 8 per cent cumulative preferred stock of the company, payable on March 31 to stock of record of March 20. This is at the rate of 8 per cent annually, but it was announced that hereafter payments on the preferred stock would be made quarterly.

**Plans to Increase Authorized Stock.**—Stockholders of Cities Service Company, New York, N. Y., at the annual meeting of the company in Dover, Del., on April 8 will be asked to approve an increase in the authorized preferred capital stock of the company from \$100,000,000 to \$150,000,000. It is felt by the directors in view of the great expansion of activities of the company, that provision should be made for its future financial requirements as well as for the conversion of the outstanding

senior securities through the approval by the stockholders of a larger authorized amount of preferred stock, even though it is not the intention of the directors to issue any of the new stock in the near future.

**Bay State Foreclosure Decree Entered.**—Judge Morton in the United States District Court at Boston, Mass., has ordered the entry of a decree for the foreclosure of two refunding mortgages totaling \$15,000,000 against the Bay State Street Railway. This is an important step toward the reorganization of the Bay State Street Railway. The Old Colony Trust Company and the American Trust Company petitioned the court. The Boston & Northern Street Railway and the Old Colony Street Railway are subject to the foreclosure order. The decree, when presented, will provide for transfer of the mortgage from the Bay State Street Railway to its successor under the reorganization plan, the Eastern Massachusetts Street Railway. When the reorganization is completed, the Bay State Street Railway will be under public control, similar to the Boston Elevated Railway. The terms of the proposed reorganization were reviewed in the *ELECTRIC RAILWAY JOURNAL* for March 15.

**Holders of Birmingham Notes Act.**—A committee which has addressed the holders of the 6 per cent two-year gold notes of the Birmingham Railway, Light & Power Company, Birmingham, Ala., due on April 1, 1919, says it is advised that there are no funds available for the payment of the notes, or interest thereon, due on April 1, 1919, and that in all probability default will be made in the payment of the notes and the interest. The company is already in the hands of a receiver and the committee representing the notes says the appointment of a receiver creates a condition which confers upon the trustee for the note issue the right, upon the written request of 35 per cent in amount of the notes outstanding, to declare the principle of all said notes immediately due and payable. Holders of the notes are being urged to deposit their securities with the Equitable Trust Company, New York, the depository under the noteholders' protective agreement dated Feb. 15. The chairman of the committee representing the holders of the notes is Thomas J. Walsh, of E. H. Rollins & Sons, New York, N. Y.

**Commission Can't Act Pending Dissolution Action.**—The Public Service Commission for the Second District of New York has ordered closed on its records the complaint of the residents of Melville, L. I., against the Huntington Railroad over proposed discontinuance of service. Commissioner Fennell, who heard the complaint, said that, since the company is continuing to operate its road pending an action in the Supreme Court for dissolution, no issue is left for determination by the commission. It was stated that the papers in the proceedings for a dissolution are prepared and ready for service. The company, prior to 1910, operated from

Huntington Station to Huntington Village and Huntington Harbor, Long Island, 3 miles. It was then extended about 15 miles across Long Island to Amityville. The company showed that from 1910 to 1917 its operating loss was \$55,180, and in 1918, \$15,764; operating revenue 1910 to 1917 inclusive, \$380,423, and expenses including taxes, \$435,603; operating expenses 1918, \$56,964. The capital stock is \$30,000; bonded debt \$26,000; accrued interest since 1910 \$11,000, and unfunded debt, \$600,000.

**Buffalo Troubles Multiplying.**—The International Traction Company of New Jersey, which owns a large part of the stock of the International Railway, Buffalo, N. Y., faces foreclosure proceedings on April 1 when the ninety days of grace expire on the payment of interest on its \$18,000,000 of collateral trust 4 per cent gold bonds. The interest became due on Jan. 1, 1919, and was not paid because the International Railway has not declared a dividend since March, 1918. The interest on the railway's bonds was paid a month ago at the expiration of the ninety days of grace, after \$425,000 had been borrowed from New York interests. An addition of 5 per cent was made to the unpaid taxes of the International Railway on March 15. The taxes were due the city on March 1. The bill is approximately \$300,000. An additional fee will be charged every month the tax is not paid. The \$300,000 due the trainmen as back wages is due in April. The back pay is based on the award of the War Labor Board which gave the men a retroactive wage increase from June 1, 1918, to the time of the strike in October. The company has not sufficient funds with which to pay the men this award.

**More People at Greater Cost.**—The Dallas (Tex.) Railway carried more people during January, 1919, than in any previous month of its history, according to a report compiled by Grover C. Bland, chief accountant in the office of the Supervisor of Public Utilities. The report shows net earnings at the rate of only 3.63 per cent, however, despite the large number of passengers carried. Under the service-at-cost franchise the company is permitted to make a net return of 7 per cent on the agreed valuation. The report shows total revenues of \$175,569 as compared with \$120,676 in January a year ago, a gain of \$54,892. The net return on the investment during January, 1918, amounted to 2.22 per cent. The operating expenses during January, 1919, amounted to \$155,143, while the expenses during January a year ago amounted to \$109,104. The report further shows that 3,468,396 revenue passengers and 540,950 transfer passengers (a total of 4,009,346) were carried during January, 1919. It is also shown that the Dallas Railway increased its mileage operation 18 per cent over a year ago. The total car-miles for January, 1919, was 609,049. Expenditures for maintenance and repairs amounted to \$30,839 as compared with \$12,447 during January, 1918.



# Traffic and Transportation

## Wants Eight-Cent Fare

**Los Angeles Line Plans Open Five-Cent Zone of One and One-Half Miles with Eight Cents Outside**

The Pacific Electric Railway, Los Angeles, Cal., suffered a net loss of \$1,695,143 during the year 1918. The increase in revenue which will be derived from increased fares now proposed by the company, if granted, will fall far short of making up this deficit for 1918, or the deficit which the company is facing for 1919, but will afford some much needed relief. The company has applied to the State Railroad Commission for authority to establish the following fares within the city of Los Angeles:

An open 5-cent fare zone to extend approximately 1½ miles from the center of the business district with an open 8-cent fare in the remaining territory on all lines where the fare is 5 cents at the present time. It is also proposed to sell a commutation ticket containing twenty rides for \$1 or 5 cents per ride. This ticket will be good to any point within the proposed 8-cent zone and will include transfers. It will be sold by conductors as well as by ticket agents but will be limited to ten days from date of sale providing two rides only for any one day during that period. Ticket will be transferable and will be good for the use of any person presenting the same, but only two rides can be used on any one day. The purpose of this ticket is to accommodate the daily rider who will continue by using the same to have the benefit of the 5-cent fare.

In the cities outside of Los Angeles, including Pasadena, South Pasadena, Long Beach, Santa Monica, Venice, Pomona, San Bernardino, Riverside, Redlands, etc., the company has applied to the Railroad Commission for permission to establish an open 7-cent fare with the same 8-cent ride commutation ticket at 5 cents per ride as proposed for Los Angeles.

Permission was granted to the Pacific Electric Railway in September, 1918, to increase and adjust its interurban fares. This was done, but no increase was made in fares within the city of Los Angeles and other outside cities.

It is not proposed by the Pacific Electric Railway to change its present interurban fares except to increase to 7 cents fares which are now 5 cents or 6 cents. This will place the minimum for interurban fares the same as the proposed 7-cent fare in cities outside of Los Angeles.

## Six Cents in Cincinnati April 1

The Cincinnati (Ohio) Traction Company made public announcement on March 15 that beginning on April 1 it will charge a 6-cent fare. Under the terms of the revised franchise the company does not have to notify William C. Culkins, street railroad director, of its intention, but must give its patrons public notice by March 15.

The fare was increased to 5½ cents at the beginning of this year under the service-at-cost arrangement.

At present children under ten years may ride on tickets that, in strips, cost 2½ cents each. There will be a flat rate of 3 cents for children under the revision.

By the terms of the franchise revision grant the company is allowed to raise the cost of fare until it creates a certain reserve or stabilizing fund.

Recently it announced the per capita cost of carrying passengers was more than 6 cents.

Raising of \$1,200,000 by the Cincinnati Traction Company through equipment trust certificates at 6 per cent interest, to be paid in ten annual installments, has been approved by Director Culkins. The issue also must be approved by the State Public Utilities Commission. The money will be spent for 150 new double-truck cars.

## Indianapolis Case Carried Up

A complaint asking that the Indianapolis Traction & Terminal Company, Indianapolis, Ind., be enjoined from collecting a straight 5-cent fare in the city of Indianapolis, because of its franchise contract providing for the sale of six tickets for 25 cents and twenty-five tickets for \$1 was filed in the Superior Court of Marion County on Feb. 26.

The complaint is brought in the name of Edward Barry, a member of the Typographical Union, representing the Central Labor Union which caused the proceedings to be instituted, and also names as defendants the Indianapolis Street Railway and members of the Public Service Commission of Indiana. It is alleged in the complaint that the order of the Public Service Commission issued in October, 1918, authorizing increased rates, gives the railway the right to take property without just compensation, in violation of the terms of the state constitution and also in violation of the constitution of the United States.

It is also alleged that the city officials in Indianapolis have failed to take the proper steps to have the order of the commission set aside and a demand was served upon the city by the organization represented by Mr. Barry.

It is expected that the case finally will be taken to the Supreme Court of Indiana on appeal, regardless of the decision in the Superior Court. No date has been set for a hearing of the complaint.

This action is the result of the refusal of the Public Service Commission of Indiana on Feb. 12 to consider a petition filed by the West Side Improvement Organization and Edward P. Barry asking for a re-hearing in the fare case of the Indianapolis Traction & Terminal Company, as reported in the ELECTRIC RAILWAY JOURNAL for Feb. 22, page 385.

## Board Ruling Forecast

**Chicago Hears Illinois Commission Will Deny Request of Surface Lines to Charge Seven Cents**

Coincident with the announcement on March 17 of the report of the Chicago (Ill.) Surface Lines for the year ended Jan. 31, 1919, showing a decrease in residue receipts of \$3,034,776, there was published in the newspapers a statement that the Public Utilities Commission of Illinois would allow no increase in the rate of fare. While this statement regarding the prospective ruling on the fare case is unofficial, it has been hinted in the financial district of Chicago for some time that the commission would refuse to give relief to the surface companies.

The commissioners are said to take the position that the war-time stringencies which caused these companies to ask for an increase are rapidly passing. It is true that the business of the Chicago Surface Lines has been picking up slightly, but the annual report indicates that a considerable gain in revenue will be required to meet the heavy burden of wages and materials. At the present time the surface companies are not earning the 5 per cent interest rate allowed by ordinance on the purchase price.

While the Chicago companies are awaiting an official announcement on the fare petition from the Public Utilities Commission, the Mayor and the Aldermen are busy in the State Legislature in a fight for "home rule." The city wants to regulate traction, telephone, electric light and gas rates and service as it did before the creation of the commission. The City Council recently adopted resolutions to this effect.

## Portland Suburban Fares Protested

The Public Service Commission of Oregon recently set March 11 as the date for reopening of the rate case, and re-hearing of evidence on rates on all interurban lines, following protest by the city of Portland against the new schedule of passenger rates on interurban lines of the Portland Railway, Light & Power Company. The new rates became effective on Jan. 1, 1919. The principal protest against them came to the Council from the Ardenwald and Errol Heights districts, where patrons declare the 7-cent fare, without transfer privilege, to be discriminatory, because patrons at Lents, a greater distance from the city, have a 6-cent fare, with transfer. Particular protest has been voiced by interurban patrons at the failure to require issuance of transfers with commutations or cash fares on interurban lines. The transfer privilege was removed by the Public Service Commission, on the theory that the interurban system was separate and distinct from the local lines and that transfers should not be interchanged between the two divisions of the railway.



## Another Partial Fare Victory

### Supreme Court Holds Atlanta Company May Increase Fare to East Point, but Not to College Park

The Georgia Supreme Court on March 15 handed down its decision, in the fare case between the city of Atlanta and the Georgia Railway & Power Company. The company lost its mandamus suit in the Superior Court, at which time it pleaded that the Railroad Commission of Georgia should assume jurisdiction in authorizing an increase in fare. Prior to this suit, the commission recommended to the City Council of Atlanta that the company be permitted to charge a 6-cent fare. The commission held that it did not have jurisdiction to order an increased fare as the city and the company had executed certain franchises previous to 1907 when the State Legislature clothed the commission with power to regulate electric railways and lighting utilities. The salient features of the decision just rendered are as follows:

1. Under the proviso contained under the fifth section of the act approved on Aug. 23, 1907, now embodied in the civil code 2662, the Railroad Commission of this State was without authority to exercise the powers conferred and extended by that act, so as to determine or fix fares upon lines of electric railroads within the limits of any town or city between which and the railroad operating such line there was a valid, subsisting contract at the time of the passage of the act.

(a) There was such a contract between the city of College Park and the Georgia Railway & Power Company, and between that company and the city of Decatur as to one line, running from Decatur to Atlanta.

(b) But, as between the cities of Atlanta and East Point and the Georgia Railway & Power Company there was no such contract.

(c) But there was a contract covering the subject of transfers, which provided that upon the payment of one full fare a transfer should be given and the railroad commission was without jurisdiction to deal with the matter of transfers.

2. A grant of power to a municipal corporation must be strictly construed and such a corporation can exercise no powers except those that are expressly given, or are necessarily implied from expressed grants. Applying this principle to the facts contained in this record the city of Atlanta was without authority to pass an ordinance fixing the rates of fare upon the railway lines constructed within the limits of the municipality, and any attempt by the municipality to pass such ordinances was nugatory.

3. In the absence of a valid, subsisting contract and ordinance on the subject of fares, it was the duty of the Railroad Commission, upon application by the Georgia Railway & Power Company, a street railroad company, to fix and determine the rates of fare upon the line of the street railroad in the city, in accordance with the law defining the powers and duties of the commission.

Mayor Key of Atlanta made the following statement:

I have not been advised by the city attorney yet as to the exact course the proceeding will take from this point on, but the probability is that the case will again be before the Railroad Commission for a hearing on its merits, and that all the facts will be gone into, particularly those facts which have developed since the last hearing before the commission. The case before the commission was for a 6-cent fare. I presume that unless a new case is made the investigation will be confined to that issue.

The consideration heretofore given the case was mainly that of an emergency war matter, this emergency will probably be given more amplitude on the next trial, the commission will have time and opportunity of going definitely into the question of valuation which it did not before.

As a matter of general interest, however, it must be borne in mind that the experience of the country is that increases in fare, however high, are very disappointing as a method of increasing revenue. It is a grievous burden to be borne by those who must use the cars, but does not affect those who do not have to use them.

All of these things are surely and certainly pointing the way to municipal ownership.

P. S. Arkwright, president of the Georgia Railway & Power Company, is of the opinion that although the war is over, labor and material have shown no decrease, and the commission will, therefore, follow its original recommendation with an order for higher fares. The Supreme Court's decision is not quite clear, in that it says the company may increase its fare to the city of East Point, but cannot increase the fare to the city of College Park, which is 1 mile beyond East Point on the same route.

### Jersey Zone Hearing March 26

The Public Service Railway, Newark, N. J., which has submitted to the Board of Public Utility Commissioners a plan for a zone system of fare collections on its lines effective on April 1, has asked the board to permit this system to become effective on the date mentioned and to modify its order requiring the company to charge on and after April 1 a fare of 6 cents and an additional charge for transfer where 7 cents and an additional charge for transfer are now charged. The board has placed the application on its calendar for hearing in Newark on March 26.

### Contract or No Contract, Rates Must Be Fair

A city is not empowered to make a binding contract with a traction company, or other public utility company, regarding rates, but such rates, regardless of ordinance provisions to the contrary, are at all times subject to a revision on a basis of a fair return to the public service company concerned, according to a decision rendered by Judge Duval West of the United States District Court for the Western District of Texas, sitting at San Antonio. The decision was rendered in a suit brought by the San Antonio Public Service Company against the city of San Antonio to gain authority to increase its fares from 5 cents to 6 cents, as referred to previously in the *ELECTRIC RAILWAY JOURNAL*.

Judge West held that the franchise ordinance under which the Public Service Company operates its cars does not constitute a binding contract in so far as the 5-cent fare is concerned. The immediate effect of the decision is to bring the railway company's case within the jurisdiction of the United States Courts and to open the way for the trial of the case in that court on its

merits. Under Judge West's holding, any public service corporation may go into the courts and on a proper showing secure an annulment of a franchise rate fixed by the city, and obtain a rate sufficient to enable it to receive what the trial court deems a fair return on the corporate investment made by the company.

### Ticket System at Portland, Me.

A new fare system substituting tickets for cash was inaugurated on the railway lines of the Cumberland County Power & Light Company in Portland, Me., on March 2, in accordance with recent findings of the Public Utilities Commission of Maine. The entire electric railway system known as the old Portland Railroad has been divided into zones in which the fare is figured at the rate of 2 cents per zone, with a minimum ticket fare of 6 cents and a cash fare of 10 cents. A 4-cent rebate is given to all passengers paying a 10-cent cash fare, redeemable before midnight of the day following at fifteen specified points on the system. The great majority of the company's patrons will use a ticket good for five rides and selling for 30 cents on the cars and at the main office of the railway in Monument Square in the heart of the city of Portland.

For use in paying fares in zones beyond the first three traversed a zone ticket may be used, also selling for 30 cents and covering transportation through fifteen zones. A central transfer area has been established in the heart of the city, so that practically all points within a mile of Monument Square may be reached on a single fare. Various through commutation tickets are also sold. An extended campaign of education was carried on before the new system went into effect, and the public appears to be receiving it most favorably. In a later issue the details of the new schedule will be described, with particulars of the campaign conducted.

### New Fare Tariff Statute Interpreted

The Public Service Commission of Washington has construed the new statute passed by the recent session of the Legislature to mean that affirmative action by the commission is required under the regulation statute as amended, before a change in railway rates can become effective. The statute gives the commission power to exceed the 5-cent fare limit on all but municipally owned lines. The commission's view of the statute will abolish the former rule permitting a rate increase to become effective automatically thirty days after filing with the commission if no protests are made. Under the rule now established, hearings will have to be held and orders issued by the commission whether or not formal protest is filed on behalf of the patrons against an increase in rates by the railway.



## Transportation News Notes

**New Commutation Rates Suspended.**—The Public Utilities Commission of Illinois has resuspended until Sept. 8, 1919, proposed advances of commutation fares by the East St. Louis & Suburban Railway, East St. Louis, Ill.

**Electors Revoke Fare Increase.**—The electors of Saginaw, Mich., have defeated the revocable franchise providing 6-cent fares granted the Saginaw-Bay City Railway last summer, piling up 9000 votes against the increased rate and but 4000 for it.

**Worcester Fare Increase Postponed.**—The tariff of the Worcester (Mass.) Consolidated Street Railway, which established a 7-cent fare unit on the system, has been suspended until March 31 by the Public Service Commission in an order dated March 7.

**In Favor of the Railway.**—Judge Martin J. Wade of the Federal Court has ruled against the application of Samuel Seeman, Des Moines, Ia., in his petition to make the receivers for the Des Moines City Railway parties to his suit to force the sale of six tickets for a quarter.

**Wants Further Fare Increase.**—The Sherbrooke Railway & Power Company, Sherbrooke, Que., is seeking an increase in fare to 7 cents cash or five tickets for 30 cents. Last December the company was authorized to increase fares from 5 cents cash or six tickets for 25 cents to 6 cents cash or five tickets for 25 cents.

**Back to Its Peace-Time Basis.**—The Illinois Traction System, Peoria, Ill., is at work on its new time-card and is planning better and quicker train service. Two fast trains have been added between Champaign and Springfield and it is said that the company will arrange to restore parlor car and other pre-war service very soon.

**Yonkers Abandonment Case Closed.**—The Public Service Commission for the Second District of New York heard oral argument at Albany a few days ago on the appeal of the Yonkers (N. Y.) Railroad for permission to abandon certain of its lines. Briefs have already been filed. The commission has reserved decision.

**Authority Over Autos.**—The Phipps bill recently passed by the Senate at Olympia, Wash., gives the Public Service Commission control over auto stages, and municipal authorities power to regulate city jitneys. The 5 and 10-cent buses are required to operate along routes selected by the city authorities and to continue in operation regularly.

**Six Cents for Akron.**—The Council of Akron, Ohio, on March 10 reconsidered

its action against the 6-cent fare ordinance and passed an amended ordinance granting the fare to Northern Ohio Traction & Light Company. The amendment provides that work shall be begun thirty days after the ordinance takes effect on the extension of the lines as provided for in the ordinance, known as the Myers-Morse-Witwer ordinance.

**Fare Advance in Violation of Franchise.**—By order of the Public Utilities Commission of Ohio effective on March 3; the Portsmouth Street Railroad & Light Company, Portsmouth, Ohio, cannot charge increased fares on its line from New Boston to Sciotoville and Wheelersburg, as proposed in a new schedule filed with the commission several weeks ago. The commission holds the proposed increase is in violation of the company's franchise rights in New Boston.

**Wants Legislature to Oppose Zones.**—Assemblyman Rowland, of Camden County, has introduced a resolution in the Legislature of New Jersey asking the House to go on record with a request to the Board of Public Utilities Commissioners that the application of the Public Service Railway to establish the zone system be denied. The resolution has been referred to the judiciary committee. The Assembly will be requested to take action on the resolution later.

**Quid pro Quo in Los Angeles.**—President Edgerton, of the State Railroad Commission of California, in a recent address said, in effect: "The public in general does not object to paying a reasonable rate providing they get adequate service." To this the Pacific Electric Railway, Los Angeles, Cal., in its own magazine has replied: "Officers and employees of the Pacific Electric Railway, therefore, must bend their energies to perfecting prompt, fast and efficient service."

**Spokane Fare Hearing March 31.**—A hearing will be held in Spokane, Wash., on March 31 by the State Public Service Commission, on the application of the Spokane & Inland Empire Railroad and the Washington Water Power Company for permission to increase their fares to 7 cents, with 1 cent additional for each transfer. Proposals by city officials that concessions in the way of waivers of franchises and bridge taxes, paving maintenance, etc., be accepted in lieu of fare increases, have been rejected by the railways. The Spokane & Inland Empire Railroad is in the hands of a receiver.

**Want Eight Cents in Yakima.**—N. C. Richards, president of the Yakima Valley Transportation Company, Yakima, Wash., has announced that he will apply immediately to the State Public Service Commission for permission to raise the fare on the company's city lines here from 5 cents to 8 cents, the plan including the sale of five tickets for 35 cents. According to Mr. Richards, the city lines, taking into account taxes and interest charges, showed a loss last year of about \$45,000. Includ-

ing suburban lines, the system, as a whole, had a deficit of \$59,000.

**Jitneys Resume in Dallas.**—Jitneys have resumed operations in Dallas, Tex., following an opinion from the office of the City Attorney that the jitneys could operate unhindered provided they remained outside the zone marked out by the law within which their operations is prohibited by the city ordinance that has been upheld by the state courts. The jitneys are now operating on Ervay Street as far as Young, which marks the southern boundary of the prohibited zone. Since the Ervay cars are being turned at Ervay and Commerce on account of the laying of new rails on Main Street, the jitneys are proving strong competitors.

**Increase for Nebraska Interurban.**—An order was issued by the State Railway Commission recently to the Omaha, Lincoln & Beatrice Railway, Lincoln, Neb., authorizing the company to increase rates beginning on March 15. The company is authorized to collect 6 cents for each ride between Lincoln and University Place, and Lincoln and Bethany; 5 cents within the Lincoln zone; 5 cents between the University Place zone and the Bethany zone and 5 cents between University Place and Bethany. The road has never paid expenses. It has maintained a 5-cent fare to University Place and Bethany ever since the Lincoln Traction Company got a 6-cent fare, but the commission finds this difference in rates made no appreciable increase in revenues for the interurban.

**Fare Case in Binghamton Put Over.**—At a hearing before the Public Service Commission for the Second District of New York on March 11 it was decided to postpone for three weeks the argument in regard to the affairs of the Binghamton Railway. It is hoped that in the meantime the appeal taken by the city of Binghamton and town of Union from United States Judge Rays' decision favoring the receiver, to the United States Circuit Court of Appeals, New York City, will be determined by the higher court. The company seeks authority to add 1 cent to the fare. The city alleges a contract exists between city and company, preventing such a raise in the fare. This, the company denies. The appeal was returnable on March 17.

**Another Partial Victory at Des Moines.**—Both the Des Moines City Railway and the city of Des Moines, Ia., won a partial victory in the hearing before Federal Judge Martin J. Wade at Ottumwa, Ia., when Judge Wade took the service case out of the hands of Polk County District Courts. Judge Wade ruled that so long as the Des Moines City Railway was being operated by receivers the state courts had no jurisdiction and that no more injunctions could be issued by the state courts against reductions in service. On the other hand Judge Wade held that the Des Moines City Railway could not put into effect new schedules covering reductions in service without first making



a showing to him that the service cuts were necessary in order to meet expense.

**Steady Improvement in Birmingham.**—The number of cars being operated daily by the Birmingham Railway, Light & Power Company, Birmingham, Ala., is showing a steady increase as the railway system gets more nearly on a normal basis. The report made by J. S. Pevear, general manager of the company, to the Public Service Commission of Alabama shows that for the seven years ending on Feb. 28, an average of 208 cars was operated. The maximum number operated during the same period was 211. The report is comparative and shows that for the seven days ending Feb. 15 an average of 182 cars was operated with a maximum of 194. During the period covered by the report there was a gain of four men in the train service, six dispatchers, and one shop employee.

**Youngstown Has Deficit Under Service at Cost.**—Service at cost for the lines of the Mahoning & Shenango Railway & Light Company in Youngstown, Ohio, shows a deficit of \$259 for the first sixteen days of operation, according to the first report of Street Railway Commissioner W. L. Sause, submitted to City Council recently. The service-at-cost ordinance became effective on Jan. 16, and the report is for the period of Jan. 16 to 31 inclusive. The terms of the service-at-cost grant in Youngstown were reviewed in the *ELECTRIC RAILWAY JOURNAL* for Jan. 11, page 99. The action of the city in passing the ordinance ended a controversy between the company and the city on the subject of service and a more recent dispute between the company and its employees about wages. The initial fare was 5 cents cash and 1 cent for a transfer. The next highest fare is 6 cents cash with nine tickets for 50 cents.

**P. R. T. Denies Commission Has Authority.**—A demurrer has been filed by counsel for the Philadelphia (Pa.) Rapid Transit Company challenging the jurisdiction of the Public Service Commission over the rate of fare on the ground that the 1907 contract with the city, in which the rate was fixed, antedates the formation of the Commission in 1912. The demurrer sets forth that, "the various rates of fare in use upon the consolidated system have been approved and fixed by contract entered into with the city of Philadelphia on July 1, 1907, and that the rates of fare having been so regularly fixed by agreement before the date upon which the Public Service Company law became effective, are not subject to alteration or adjustment without the consent of both parties." The company in Philadelphia has in use an 8-cent exchange ticket. Complaint against this system was made to the commission on July 16, 1917, by the Northwest Business Men's Association. On account of the demurrer the hearing before the commission has again been put over indefinitely.

## Personal Mention

### Changes in Birmingham Personnel

Fred V. Underwood has been made assistant general manager of the Birmingham Railway, Light & Power Company, Birmingham, Ala. He took up his duties with the company on March 10, after having resigned his position as superintendent of production with the Alabama Power Company to accept the place. Mr. Underwood is a brother of Senator Oscar Underwood. He was connected with the Birmingham Railway, Light & Power Company for a number of years, but resigned from the company last October to go with the Alabama Power Company.

J. S. Pevear, general manager, will be relieved of some of his duties by the appointment of Mr. Underwood. Mr. Pevear will devote a good deal of his time to the work of rehabilitating the properties of the company. This work has been undertaken by the receiver and is being pushed through as rapidly as possible.

L. L. Newman has been named chief engineer. He will devote practically all his time to maintenance work.

H. E. Cox, formerly an engineer for the Birmingham Steel Products Company, will be Mr. Newman's assistant.

In a statement to the press Mr. Pevear said that in view of the fact that the receiver intended to rehabilitate the property as rapidly as possible Mr. Newman would devote practically his entire time to the work of getting the tracks, ways and structures of the company in shape in the shortest possible time.

### Changes in Power Department

R. W. Lamar has been appointed manager of the power department of the Monongahela Valley Traction Company, Fairmont, W. Va., and Francis McQuillan has been appointed assistant manager of the power department.

Both Mr. Lamar and Mr. McQuillan will have headquarters in Fairmont, W. Va.

Captain Lamar has only recently secured his discharge from the United States Army. For the past several months he has been connected with the power section of the War Industries Board where he rendered valuable service to the government and won the commendation of his superior officers. He is a graduate electrical engineer, having secured his education at Washington University, St. Louis, Mo.

The assistant manager of power has been with the Monongahela Valley Traction Company for some time. He held the title of commercial engineer in the power department, so that he will be entirely familiar with his duties in that department.

A reorganization of the power department became necessary because of the enlarged responsibilities of that department with the construction of the Riversville power plant, and also because D. A. Maurer, who has been chief electrical engineer for the company for several years, recently decided to devote his entire time to his private interests. He is the head of the Fairmont Electrical Service Company and also the Mine Service Supply Company, Fairmont.

### Personnel of Seattle's Municipal Railway

Thomas F. Murphine, superintendent of Public Utilities, Seattle, Wash., has been appointed to have charge of the electric railway system which the city has purchased from the Puget Sound Traction, Light & Power Company. The property will be taken over by the city early in April. Mr. Murphine is rapidly completing plans for organization of his department. He has accordingly announced that three members of his present staff will be retained. Edward I. O'Brien, assistant superintendent of the utilities department for nine years, will continue in that position. J. J. Wettrick, chief engineer, will become chief engineer of the new railway and will also be superintendent of way and structure. Allen B. Hiatt, chief accountant in the utilities department, will become auditor of the railway system.

Present plans contemplate the operation of the railway system through five general departments—the mechanical, engineering, transportation or operation, correspondence and intelligence. The latter department has been originated by Mr. Murphine, who intends it to represent the public, and to act as a buffer between the people who use the cars and the department. Service complaints or other matters affecting the public will be investigated by this department. The members of it will be responsible only to the superintendent of utilities. The department will also include an educational branch, for the purpose of familiarizing the public with measures that will ultimately result in better service.

The intelligence department will also be required to follow the three contracts which are part of the railway deal. Mr. Murphine believes that with the right man on the job, considerable saving may be effected on the contract for purchase of electric current from the traction company for the operation of the cars. The intelligence department will also be required to keep a lookout for leaks in the use of current. Mr. Murphine further believes that the department will be able to make money



for the city on the interurban contracts. The city has agreed to permit the Tacoma and Everett interurban trains, which will continue under the Puget Sound Traction, Light & Power ownership, to operate over the municipal tracks on a mileage basis, taking into consideration the weight and number of cars.

**E. Commodore Bowman**, general superintendent of the Monongahela Valley Traction Co., will be transferred to Fairmont, W. Va., on April 1. Mr. Bowman has had his offices in Clarksburg for some time.

**Frank T. Hamilton**, vice-president of the Omaha & Council Bluffs Street Railway, Omaha, Neb., has been elected president of the company to succeed G. W. Wattles, resigned. Mr. Wattles has been made chairman of the board. No succession to the first vice-presidency has yet been announced.

**J. N. Tabb**, assistant treasurer of the Monongahela Valley Traction Company, Fairmont, W. Va., has resigned and moved to Parkersburg, W. Va., where he will be associated with the Crawford oil interests. Mr. Tabb went to Fairmont as assistant treasurer of the Monongahela Valley Traction Company when the Kanawha Traction & Electric Company's interests were absorbed by the Monongahela Valley Traction company several years ago.

**W. V. Neal**, former resident of Parkersburg, W. Va., but more recently connected with the Trinidad (Col.) Traction Company, has been appointed assistant general manager of the Monongahela Valley Traction Company with headquarters at Clarksburg, W. Va. For several years Mr. Neal was connected with the Stone & Webster interests at El Paso, Tex. He was also for several years an employee of the United States government and had charge of the construction of numerous government projects in the Philippine Islands.

**George M. Alexander**, who returned to Fairmont, W. Va., recently after a number of months' service in the ordnance department of the War Department has been elected president of the Monongahela Valley Traction Company. This action followed the resignation of S. L. Watson, chairman of the board of directors, and the advancement of J. O. Watson, until this time president of the company, to the position of chairman of the board. The new president has been identified with the company for a number of years as the head of its legal department. Upon him fell much of the detail involved in the absorption of the Parkersburg lines, the purchase of the Stafford mine and the beginning of the great power plant at Rivesville, which undertaking is now nearing completion.

**Edward A. West**, formerly chief engineer of the Denver (Col.) Tramway and the Denver & Intermountain Railroad, has been appointed general superintend-

ent of the companies. Mr. West was called to Washington early last year and requested to take charge of passenger transportation and housing matters for the United States Shipping Board, Emergency Fleet Corporation, on the Pacific Coast. The territory covered extended from San Diego, Cal., to Bellingham, Wash., and comprised three shipyard districts, the Southern Pacific District, North Shipping District and Wood Ship Division No. 11. About the first of the year he resigned from the Emergency Fleet Corporation and returned to the Denver Tramway and the Denver & Intermountain Companies as general superintendent.

**J. E. Lawless** has recently been appointed master mechanic of the El Paso (Tex.) Electric Railway. Mr. Lawless was born in Smithland, Ky., on June



J. E. LAWLESS

3, 1880, and was graduated from the English High School, Hampton, Ky., in 1896. Subsequently he completed the correspondence course in electrical engineering with the International Correspondence Schools. He entered electric railway work in 1898 and has been connected with Stone & Webster for a number of years in different branches of that company's organization. He was formerly master mechanic of the Paducah Traction & Light Company, Paducah, Ky., and later general foreman of the Northern Texas Traction Company, Fort Worth, Tex. He entered upon his duties as master mechanic of the El Paso Electric Railway on Jan. 1 of this year.

**J. R. Wilson**, traffic manager of the Sacramento Northern Railroad, office at Sacramento, Cal., has tendered his resignation to President G. F. Detrick effective on April 30. Mr. Wilson went to Sacramento nearly five years ago to become traffic manager of the Northern Electric Railway, which, after its reorganization, adopted the name of Sacramento Northern Railroad. Prior to this he was with the Southern Pacific Company general freight office in San Francisco and later commercial agent for the Illinois Central Railroad in that city. Mr. Wilson has made no an-

nouncement as to his future connections. The appointment of his successor will be made later.

**Guy C. Pierce**, Los Angeles, Cal., has been elected vice-president and general manager of the Northwestern Electric Company, Portland, Ore., succeeding Wilbur E. Coman, who, as noted previously in the *ELECTRIC RAILWAY JOURNAL*, has become connected with the Washington Water Power Company at Spokane. During the greater part of 1909 and 1910 Mr. Pierce represented Eastern capital interested with R. C. Gillis in the development of the Mt. Hood Railway & Power Company's projects at Portland, which later were taken over by the Portland Railway, Light & Power Company. Mr. Pierce became identified with the electrical industry at Sacramento in 1887 and was responsible for a number of the pioneer lighting and power installations in California. In the three years from 1901 he was located at Mexico City in charge of electrical properties and during the two years following he was chief inspector for the Hudson & Manhattan Railroad at New York. From 1906 to 1909 he was identified with the East St. Louis & Suburban Railway, controlled by E. W. Clark & Company, Philadelphia, now interested in the Portland Railway, Light & Power Company. In the four years following his temporary residence in Portland, Mr. Pierce represented Eastern capital in reporting on proposed railway and hydroelectric power projects in states bordering on the Pacific Coast.

## Obituary

**Charles F. Bachman**, East Orange, N. J., master mechanic of the Essex division of the Public Service Railway, died recently after a brief illness from pneumonia. Mr. Bachman was born in Wilkes-Barre, Pa., in 1885. After graduating from the school of mechanical engineering at Cornell University he moved to Elizabeth, N. J. He had been employed by the Public Service Railway for the last eleven years. Mr. Bachman leaves a widow and an infant son.

**John J. Gettings**, superintendent of the Central division of the Public Service Railway at Elizabeth, N. J., died recently at St. Elizabeth's hospital at that place after a brief illness from pneumonia. He was stricken while at work at the carhouse. Mr. Gettings was born in Brooklyn forty-nine years ago. For a time he was employed by the Brooklyn Rapid Transit Company, and in 1903 became identified with the Public Service Railway. He was stationed at Newark at first. Several years ago he was appointed superintendent of the Central division. Mr. Gettings is survived by a widow.



# Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER,

SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES

BUSINESS ANNOUNCEMENTS

## Lower Prices Required for Successful Export Trade

**Better Co-operation as to Consumer Requirements and More Consideration on Deliveries Needed**

In outlining the steps which American manufacturers must take to hold their foreign trade, E. M. Herr, president of the Westinghouse Electric & Manufacturing Company and a director in the American Manufacturers' Export Association, declared recently that reductions in high wages accompanied by a reduction of prices were essential.

"The development of export business in electrical machinery, under the present condition of export markets," said Mr. Herr, "would be very rapid and of unusual extent were it not for the high prices which must now be charged for this product. There are some countries which, owing to the ravages of war and the necessity of first remedying the most serious destructive effects of this strife, cannot immediately take up the development of peaceful pursuits. It is in this that electrical machinery finds its legitimate field.

"The most vigorous effort should be made by those engaged in the manufacture of electrical machinery to bring prices to a point approximating those obtained for this material in foreign countries, as with the domestic market slowing down, due to the transition from war to peace conditions, the present time is particularly advantageous for the development of the export field. It is encouraging to note important decreases in the cost of a few of our raw materials and if some yielding of the very high labor costs can also be obtained, we would very soon find an expansion of the export demand for electrical machinery that would more than compensate labor for any sacrifices in hourly rates by the longer hours and more continuous employment which would result.

"In the industrial countries of the world the enormous increase in demand for manufactured products caused by the war has shown the great need for and advantage in the use of electrical machinery, making those countries particularly keen to avail themselves of the economies and advantages of electrical power. This is especially true in countries where fuel is scarce and expensive and where water power is available. Plans are already well matured for the development of larger central electrical power stations in some of the most important industrial countries and extensive projects for the electrification of some of their railroads are well under way. The smaller

and less economical steam plants will in this way be displaced by larger and more economical ones and the demand for transmission and current-consuming devices be greatly enlarged.

"The largest electrical manufacturing companies abroad are in Germany and it will be some time before they can operate advantageously. This will give the American companies an unusual opportunity, if promptly seized, of bringing our exports of electrical machinery to an amount and value which is not possible under normal conditions.

"In seeking electrical machinery business in export territory, our agents must make their principals realize that the machinery we sell these people must be designed and built for their requirements and not, as has in the past too often been the case, as we are accustomed to build it. Much effort has been expended in trying to convince the foreign buyer that our styles and construction were best and should be satisfactory to him, instead of making a real effort to ascertain just what he desired and then furnishing it.

### SERVICE MUST BE GIVEN

"In addition to adapting our goods to export requirements, we must arrange to give service in this trade at least as good as in our domestic market. Too often export shipments have been delayed and foreign customers disappointed on account of the domestic demand becoming suddenly unusually active, when export orders were made to wait while the rush of domestic orders was worked off. This policy is fatal to proper progress in export trade and must be abandoned if real development of the foreign field is to be secured. In fact, just the opposite policy should be pursued and export shipments given preference over domestic, as, because of infrequent transportation service, failure to meet sailing dates results in a very much more serious delay to the customer than the actual delay in production—a condition which does not obtain in domestic business because of better transportation facilities.

"We should never forget in any industrial business that we are selling service as well as product and that however good the quality of one's product, if the material does not come when needed, is not packed properly, or in any other way our service to the customer is unsatisfactory, the transaction fails to tend to tie him to the producer and permits a competitor to obtain a foothold not otherwise possible. These are ordinary principles of business but apply with unusual force when we are dealing with foreign customers.

## Maintenance Prices Show Little Change

**Copper Products Affected According to Relation of Metal to Labor—Rail Bonds Show Improvement**

There has been little price change in general in the maintenance line of electric railway materials for the past six months. Copper products have shown decreases in several instances and some of the track and line equipment has decreased within this time, but these latter changes have been slight compared to those in copper.

Crossarms have just decreased 5 to 7½ per cent on some sizes on all quantities from stock.

Cross-ties of the hewn variety are still selling for \$1.20 to \$1.60 each, the scarcity of labor in tie-camps generally accounting for the price remaining at this level. Small stocks are kept cut near rights-of-way in many parts of the country.

Friction tape has a constant call in maintenance work, and, regardless of the lower cost of raw cotton, is not being sold at any appreciable reduction. Prices for different manufacturers vary due to the different qualities involved. Labor cost after the raw cotton is delivered is the determining factor.

Varnished cambric has been found off about 2 cents a pound.

Lubricating oil has been reported as holding to the prices of last fall, with an upward rather than a downward tendency.

Rubber-covered wire manufacturers are for the most part using a 20-cent base at this time, and some very satisfactory business has been uncovered.

Bare wire is being quoted on about a 17½ cent base. Many fair sized orders for railway maintenance have been reported, and inquiries from the export field have been numerous. Weatherproof wire is quoted from 18½ to 20 cent base with rather satisfactory orders of a maintenance character.

T-rails are still holding at from \$55 to \$65, but it is expected that this price will be reduced following the decisions of the steel manufacturers and the government interests.

Grooved rails continue at a quotation of 4½ cents per pound, and this price also is expected to be affected.

Railroad spikes are down to 3.65 cents a pound, but screw spikes have not shown any change from the 8 cents which has been holding for some time.

Tie plates and rods, fish plates, angle plates and angle bars fell off one-quarter of a cent from the government price and are at 3 cents a pound. Rail



bolts and nuts, however, are still holding their former price of 4.90 cents a pound.

Car window glass has shown no change in price for some months, and there appears to be no reason to expect any decrease in the immediate future.

Cotton waste is quoted at 8 to 13½ cents per pound, and wool waste at 14 to 17 cents. Some railways use wood waste for journal packing up to 40 cents a pound. On account of the curtailment of the cotton and wool products from which this waste comes, the tendency of the price of each kind is upward.

The continually decreasing price of copper has brought down the price of several kinds of railway materials to a greater or a lesser extent as the amount of copper in the article varies and as the labor item varies. For instance, commutator bars have recently dropped 20 per cent, and such products as armature coils, field coils and strap copper fuses have dropped from 10 to 20 per cent.

Trolley crossings and splicers for trolley wire are still on February discount lists, the crossings at 43 per cent and the copper sleeves at 48 per cent.

Rail bonds have changed for the better a number of times since January 1, and the last quotation leaves them at 25 per cent off list.

Welding rods for use in filling cups and other imperfections in rails are varying from 12 to 18 cents per pound, depending on the quantity ordered, while rods for normal use in railway shops for repair work vary from 10 to 15 cents per pound, depending on the quantity.

## Permanent High-Price Level

**Prominent Economist Urges Buyers to Face the Facts and Act Accordingly**

Goods are on a permanently higher price level and the sooner the business men of the country take this view and adjust themselves to it the sooner will they save themselves and the nation from the misfortune which will come by persisting in the present false hope of lower prices, according to Irving Fisher, professor of political economy of Yale University. This sentiment was the theme of his discourse before the recent conference of governors and mayors at the White House.

"The main reason why business is not going ahead better," declared Prof. Fisher, "is that most people expect prices to drop. It is interesting to observe that many manufacturers think that prices must come down, including the price of labor; but they are ready to demonstrate to you that their prices cannot come down, nor can they pay lower wages. Almost everything they buy somehow costs twice as much as before the war, and their labor is twice as dear. They cannot pay their labor less if labor is to meet the increased cost of living. Now, as a matter of fact, when we investigate almost any

individual one of the so-called high prices for industrial products we are likely to find that individually it is not high; that is, it is not high relatively to the rest. Our quarrel is with the general level of prices."

Prof. Fisher then went on to explain the dependence of prices on the circulating medium. Greater circulation of money for the same volume of goods means higher prices. Vast government loans and the large credits have the same effect. The present tendency, however, is not to contract credits, but to enlarge them. In conclusion, therefore, Prof. Fisher states:

"Business men should face the facts. To talk reverently of 1913-14 prices is to speak a dead language today. The buyers of the country, since the armistice, have made an unexampled attack upon prices through their waiting attitude, and yet price recessions have been insignificant. The reason is that we are on a new high-price level, which will be found a stubborn reality. Business men are going to find out that the clever man is not the man who waits, but the one who finds out the new price facts and acts accordingly."

## Rolling Stock

**Granite City Railway, St. Cloud, Minn.,** has just placed a contract for six new cars.

**Jersey Central Traction Company, Keyport, N. J.,** is converting four fourteen-bench open cars into a closed type. The company is also rebuilding trucks of fifteen semi-convertible interurban cars. The work is being done through a loan from the United States Bureau of Housing.

**Portland Railway, Light & Power Company, Portland, Ore.,** has recently received and put into operation twenty-five one-man cars purchased by the Emergency Fleet Corporation for the use of the traction company. The purchase was noted in these columns of Aug. 3, 1918.

**Cincinnati (Ohio) Traction Company** has received permission from the Ohio Public Utilities Commission to issue \$1,250,000 equipment trust certificates, the proceeds to be used in the purchase of 105 double-truck closed cars of the pay-within type.

## Franchises

**Babylon, L. I.—**The Babylon Railroad is negotiating with town officials of Babylon for a franchise covering the supply of electric energy for lighting and power purposes to the municipality.

**Gary, Ind.—**The Board of Public Works of Gary has granted a franchise to the Gary Street Railway to establish a car storage yard and tracks at the southwest corner of Adams Street and Twenty-second Avenue, where the company will expend about \$15,000 in laying tracks and making connections with the main line.

## Recent Incorporations

**Levis (Que.) Tramways.**—A bill has been introduced in the Quebec Legislature for the incorporation of the Levis Tramways, as a reorganization of the Levis County Railway. Capital stock, \$1,500,000. The petitioners are Senator Raoul Dandurand, S. H. Ewing, J. A. Ewing, Montreal; E. A. Macnutt, Westmount, and J. C. Blouin, who are to be provisional directors. The applicants ask authority to extend the present railway in Levis and in or between any of the various municipalities of the counties of Levis, Bellechasse, Dorchester and Beauce; authority to build branches not exceeding 15 miles in any one case from the main line; also power to enter into agreements for extending the line as far as the Quebec Bridge and over the same and also on the north shore of the River St. Lawrence, and to connect at some point with the line of the Quebec Railway, Light, Heat & Power Company.

## Track and Roadway

**Birmingham, Ala.—**It is reported that Major John R. Fordyce of the United States Engineers, serving with the Mississippi-Warrior Waterways Administration, will survey the territory between Birmingham and the Warrior River and will also prepare estimates of the cost of terminals and of the railway which is contemplated to connect the city with the waterway. This work is to be undertaken immediately. W. D. Nesbitt of Birmingham is chairman of the Warrior River Development Committee.

**Gadsden, Ala.—**It is reported that plans are being considered for the construction of an interurban line to connect Gadsden, Alabama City, Attalla, Boaz and Albertville. According to the report, the company will establish a distribution system in Gadsden and will furnish electricity to consumers in that city and in Alabama City. It is said that the company will obtain its power from the Alabama Power Company.

**British Columbia Electric Railway, Vancouver, B. C.—**The construction of a line on the Alma Road from Kerrisdale to Fourth Avenue is contemplated by the British Columbia Electric Railway.

**Georgia Railway & Power Company, Atlanta, Ga.—**The Georgia Railway & Power Company will rebuild its tracks on Edgewood Avenue between Peachtree and Pryor Streets.

**Boston (Mass.) Elevated Railway.**—Operation has been begun on the extension of the Boston Elevated Railway from Sullivan Square, Boston, to Everett.

**Kansas City, Lawrence & Topeka Railroad, Kansas City, Mo.—**The Kansas City, Lawrence & Topeka Railroad will rehabilitate its line at a cost of about \$15,000.



**Tulsa (Okla.) Street Railway.**—Work will be begun at once by the Tulsa Street Railway on the extension of its lines on North Main Street, North Cheyenne Avenue and South Main Street.

**Toronto, Ont.**—At a recent executive committee meeting of the Hydro-Electric Railway Association at the office of the provincial Hydro-Electric Power Commission at Toronto it was decided to move in the matter of constructing an electrical railway in the district extending westerly from Toronto through Brampton, Guelph, Kitchener, Stratford and St. Marys to London as soon as possible, as desired by the municipalities concerned. A preparatory move will be the urging of the immediate repeal of certain amendments to the hydro-electric railway as requested by the municipalities.

**Toronto (Ont.) Electric Railway.**—It is reported that the Toronto Electric Railway will construct 3 miles of new track at an estimated cost of \$800,000. The cost of the construction of the substructure is estimated at \$580,000.

**Scranton & Binghamton Railroad, Scranton, Pa.**—Reorganization plans for the Scranton & Binghamton Railroad contemplate the merger and consolidation of the Binghamton Railway and the Northern Electric Company with the Scranton & Binghamton Railroad, the construction of a new terminal station at Scranton and the extension of the line from Tiffany Junction to Binghamton. Preliminary surveys have been made of the proposed route for this extension and options taken on much of the necessary right-of-way.

**Burkeville (Tex.) Railway.**—It is reported that the Burkeville Railway has been organized to construct a line from Burkeville to Wiergate, about 3 miles. Officers: E. F. Montgomery, president; J. F. Woods, first vice-president; K. Jackson, second vice-president; L. C. Wood, treasurer, and J. M. Nation, secretary.

**Dallas, Tex.**—Plans are being prepared by engineers for the proposed electric railway to be built from Dallas to Wichita Falls. The following publicity committee is working on the project: Wiley Blair, John N. Simpson, T. E. Jackson, E. J. Kiest and Tom Finty. At a recent meeting held at Dallas a resolution was adopted pledging \$75,000 to the enterprise, of which two-thirds is to be raised in Dallas and the rest in Wichita Falls. [Feb. 8, '19.]

**Richmond & Chesapeake Bay Railway, Richmond, Va.**—Plans are under way at Richmond to organize the Richmond-Ashland Railway to purchase and operate the line of the Richmond & Chesapeake Railway from Richmond to Ashland. First mortgage bonds will be issued and opened for public subscription immediately to raise the \$200,000 necessary to buy and rehabilitate the line. J. L. Vaughn, president of the Petersburg, Hopewell & City Point

Electric Railway, has agreed to direct the operation. The Richmond & Chesapeake Bay Railway ceased operating in December, 1917.

**Seattle (Wash.) Municipal Railway.**—Arrangements have been made to resume work immediately on the municipal elevated railway in Seattle to the West Side, following assurances that money to complete the project will be provided in not to exceed two weeks from the recent \$400,000 bond sale. The connection with the surface lines at Washington Street, and construction of the trestle to connect with the Lake Burien line west of the Spokane Street bridge are required to complete the project.

**Wisconsin Public Service Company, Green Bay, Wis.**—A committee of business men has been appointed in Luxemburg, Casco, Algoma, New Franken and Kewaunee to meet officials of the Wisconsin Public Service Company and ascertain under what conditions the company will extend their lines from Green Bay through Kewaunee County to these cities and villages.

### Power Houses, Shops and Buildings

**Hanover Light, Heat & Power Company, Hanover, Pa.**—Plans have been prepared by the Hanover Light, Heat & Power Company, which supplies power to the Hanover & McSherrystown Street Railway for the installation of a 1000-kw. turbo-generator and surface condenser with a suitable spray cooling system. Revamping of certain existing distributing lines by raising the voltage to 13,000 volts is also under consideration. A new switchboard is now being installed to meet the requirements of the new plant.

### New Advertising Literature

**Barrett Company, New York City:** Pamphlet on the application of "Carbosota" creosote oil to posts, poles, etc., with suggestions for constructing simple treating plants.

**Metal & Thermit Corporation, New York City:** Large map/calendar, the map showing the railroad time zones in the United States, which went into effect on Jan. 1, 1919.

**Bonham Recorder Company, Hamilton, Ohio:** Eight-page leaflet on latest type of traffic recorder. It records miles traveled, kind of fare paid, amount of cash fare, total number of passengers, number of cash passengers, month, day, train and division. It also gives the autograph of the conductor who made it. From this printed record the following may be obtained: Travel between stations, density of traffic, revenue per passenger-mile, revenue per car-mile, revenue by trains, revenue by stations, per cent of ticket revenue, per cent of cash revenue.

### Trade Notes

**J. S. Cullinan** has recently been elected president of the Galena Signal Oil Company.

**Scovill Manufacturing Company, Waterbury, Conn.**, has recently filled several orders for metal tokens, paying particular attention to factors that would make counterfeiting impracticable if not completely impossible.

**J. F. Mackin, Columbus, Ohio**, has recently become connected with the Black & Decker Manufacturing Company of Baltimore, as representative throughout the entire State of Ohio. Mr. Mackin has been connected with the portable electric drill industry for years, his former connection being with the Independent Pneumatic Tool Company.

**J. E. Slimp**, who has for many years been connected with the sales department of the Ohio Brass Company, has resigned to become associated with H. C. Dodge of Boston, who is at the head of several manufacturing companies in New England. Mr. Slimp will remain with the Ohio Brass Company until approximately April 1.

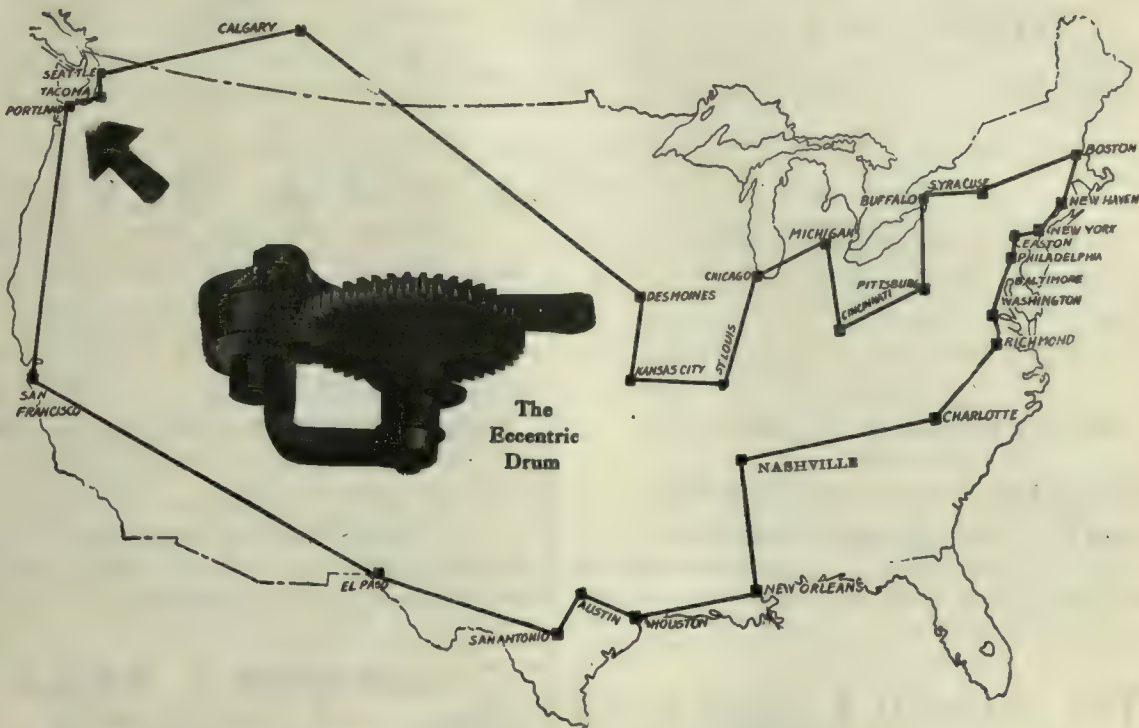
**E. V. Adams** succeeds G. K. Heyer as railway sales engineer of the Western Electric Company. He has been a Western Electric man since 1910 when he began in the railway sales department of the Chicago house. He was transferred to St. Louis in 1912 and the following year went to 195 Broadway, New York, where his headquarters will remain.

**W. D. Hamer**, representative of the Electric Service Supplies Company, Philadelphia, Pa., has been transferred from his former territory in the Middle West to a Southern territory with headquarters in Atlanta, Ga. He has been connected with this company for fourteen years. Prior to 1905 he was employed in the stores and engineering department of the Lehigh Valley Railroad Company. In 1907 with the courtesy and co-operation of the Nashville Railway & Light Company, he proposed and developed what is reported to be the first prepayment car operated in the South. Mr. Hamer is inventor of the Keystone triangle arm.

**Pulverized Fuel Equipment Corporation** has recently been organized for the purpose of taking over the business of the Locomotive Pulverized Fuel Company and to broaden the activities of the latter to cover the central power station, metallurgical and industrial fields. The head offices are at 30 Church Street, New York City, with a Canadian office in the Transportation Building, Montreal. The officers of the new company will be J. S. Coffin, chairman; J. E. Muhfeld, president; H. F. Ball, vice-president, executive; H. D. Savage, vice-president, in charge of sales; V. Z. Caracristi, vice-president, in charge of engineering, and Samuel G. Allen, secretary-treasurer.



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prices, a mention of the Electric Railway  
Journal would be appreciated.

## ELECTRICAL TESTING LABORATORIES

Electrical, Photometrical and  
Mechanical Testing.

80th Street and East End Ave., New York, N. Y.

## Scofield Engineering Co.

Consulting Engineers  
PHILADELPHIA, PA.POWER STATIONS  
HYDRAULIC DEVELOPMENTSGAS WORKS  
ELECTRIC RAILWAYS



# AMERICAN BRIDGE COMPANY

HUDSON TERMINAL-30 CHURCH STREET, NEW YORK

*Manufacturers of Steel Structures of all classes  
particularly BRIDGES AND BUILDINGS*

## Sales Offices

NEW YORK, N. Y. . . . 30 Church Street  
Philadelphia, Pa. . . . Widener Building  
Boston, Mass. . . . John Hancock Building  
Baltimore, Md. . . . Continental Trust Building  
PITTSBURGH, PA. . . . Frick Building  
Buffalo, N. Y. . . . Marine National Bank  
Cincinnati, Ohio . . . Union Trust Building  
Atlanta, Ga. . . . Candler Building  
Cleveland, Ohio . . . Guardian Building  
Detroit, Mich. . . Beecher Ave. & M. C. R. R.  
CHICAGO, ILL. . . 208 South La Salle Street

St. Louis, Mo. . . Third National Bank Building  
Denver, Colo. . . First National Bank Building  
Salt Lake City, Utah . . Walker Bank Building  
Duluth, Minn. . . . Wolvin Building  
Minneapolis, Minn. . . 7th Ave. & 2nd St., S. E.

## Pacific Coast Representative:

U. S. Steel Products Co., Pacific Coast Dept.  
San Francisco, Cal. . . . Rialto Building  
Portland, Ore. . . . Selling Building  
Seattle, Wash. . . 4th Ave. So., Cor. Conn. St.

Export Representative: United States Steel Products Co., 30 Church St., N. Y.

**Line Specialties in Greater Varieties**

**Est. 1877**

**Our Products Are Quality Products**

**Anderson**

**Trolley Wheel**

**Section Insulator**

**Anderson Double Beam**

**Albert & J. M. Anderson Mfg. Co.**  
289-293 A Street  
Boston, Mass., U. S. A.

**BRANCHES:**  
New York, 135 Broadway.  
Chicago, 105 So. Dearborn Street.

Philadelphia, 429 Real Estate Trust Building  
London, E. C., 48 Milton Street.



# A New Phase of U. G. I. Service

*Construction, Engineering  
and Sales of Residuals to  
Have Separate Organization*

**T**HE United Gas Improvement Company becomes another of the big industries of the country to go on record as predicting prosperity during coming world peace. The officials of this progressive corporation realize that, with the inevitable future increase in the sale of products by Gas and Electric Companies, there will be a great demand for new and additional plant equipment, and that the marketing of residuals will require a well planned sales organization.

The construction and manufacture of gas apparatus and the sale of by-products have been heretofore divided among several departments of the parent Company, but in the future they will be handled by a new company, to be known as The U. G. I. Contracting Company.

Mr. Paul Thompson, one of The U. G. I. Vice-Presidents, heads the new Company as President, and Messrs. J. A. P. Crisfield and D. J. Collins are Vice-Presidents. Additional officers will be appointed later.

The U. G. I. Contracting Company will engage in the construction and sale of water gas apparatus, vertical retorts, waste heat boilers, and gas plant auxiliaries of various kinds; it will furnish advice, make designs for construction changes and betterments to both gas and electric plants; make examinations and reports in connection with their operation; erect electric power plants; engage in general construction; purchase and sell residuals of all kinds; and construct and maintain roads and highways under contract.

The extensive work in road making and repairs now planned by many states will make this latter activity of the new company a most important one.

It is also planned to seek contracts for the painting of holders, structural metal work, bridges, marine structures and ships—in fact, industrial painting of all kinds.

The need for such an organization as The U. G. I. Contracting Company has been felt by the U. G. I. officials for some time. The work has grown to such proportions that it cannot be advantageously handled by the parent corporation through its various departmental activities. The new company will have greater freedom of action when separated from the operating organization; a capacity for additional volume of work and a quickening of action when operating as a distinct company, flexible in its organization and under centralized management.

The personnel of the new company will include the many engineers and sales experts now occupied with the parent company who have been engaged in these duties for a number of years. These men will be released by their departments and take up their new duties at once.

**The U. G. I. Contracting Co.**  
Broad and Arch Streets, Philadelphia

*In War or  
Peace Times—*

## Cut Out the Waste!

Clean up! Do it NOW! Do it regularly!

Every piece of Idle Equipment, Unnecessary Material or Scrap represents **WASTE!**

—*waste*

**Money!**

**Time!**

**Space!**

**Labor!**

**Material!**

—the *money* such equipment or material cost earns nothing and is not available for other use.

—the *time* it is idle is wasted when it can render service elsewhere.

—the *space* it occupies costs money and may be needed for other purposes.

—the *labor* of its manufacture is wasted and also the labor of producing a duplicate for the man who *can* use it.

—the *material* it represents would be useful in another form.

Cut out *all* this waste! Don't have material or equipment around that is not needed. Turn it into cash.

There is always a market for either scrap or good used machinery. Conservation of both materials and machinery can be practiced with just as much profit in peace as in war times.

Buyers for surplus material, good used machinery, junk or scrap, can easily be found through the

**Searchlight Section**





PISK STREET POWER HOUSE, CHICAGO, ILL

## SERVICE AND ADVICE

In this period of industrial expansion the Thompson-Starrett Company addresses itself particularly to those institutions which seek competent counsel before embarking on important additions to their plants.

We are glad and accustomed to sit in at those preliminary conferences where plant extensions and other engineering problems are discussed and where it is so vital that mistakes shall be avoided.

In other words, we will not only build your plant, we will advise you as to the best way to build it.

This service involves no obligation other than that which you owe to your own best interests when we get through.

*Our Advice is as good as our Service*

### THOMPSON-STARRETT COMPANY

INDUSTRIAL CONSTRUCTION  
NEW YORK

CHICAGO

PITTSBURGH





## Collins Automatic Non-Splashing Track Switch

It is not the Safety Car in itself which is helping traction companies earn increased revenue all over the country. It is something *more* than that. It is the ability to operate their cars ("Safety" or otherwise), on closer headways, faster schedules. The public is willing to *pay more fare* when better, faster, safer service can be demonstrated. One of the most important adjuncts to such faster, safer car operation is the Collins Automatic Non-Splashing Track Switch.

The Collins Automatic Non-Splashing Track Switch helps the car operators to make meets promptly with no loss of standing time, and no annoying interruption to their routine, and *no absence from the car*.



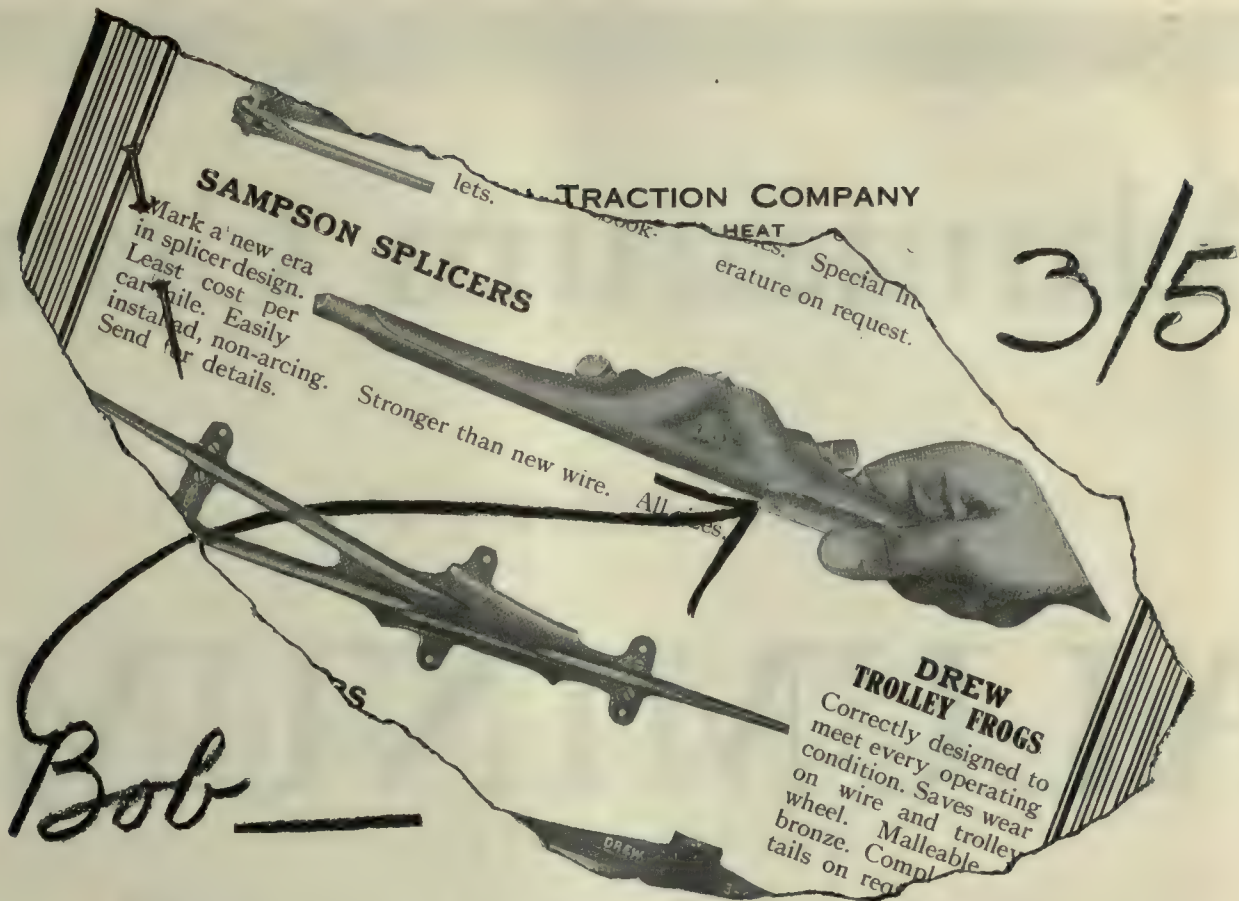
**United States Electric Signal Company**  
West Newton, Mass.

*Representatives:*

Western: Frank F. Bodler, Monadnock Bldg., San Francisco  
Foreign: Forest City Electric Service Supply Company, Salford, Eng.







This is that smooth running splicer we heard about the other day. Their lug design can't be substituted and in my opinion it is the answer to perfect clenching. Better write the Drew company and give them an order. It looks like a good proposition.

Might also get latest catalogue on their entire line of overhead.



---

# Aluminum Com

*Manufacturers of*

# ALUMINUM

## Electrical Conductors

**GENERAL SALES OFFICE: Oliver**

CANADA: Northern Aluminum Co., Ltd., Toronto

LATIN AMERICA: Aluminum Co.

---



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# pany of America

*All-Aluminum and Steel Reinforced  
for*

**Transmission Lines**

**Railway and Industrial Feeders**

**Signal Circuits**

**Railway Catenary Construction**

**Bus Bars**

*also*

**Ingots—Rods—Rivets—Extended Shapes**

**Sheet Tubing**

*also*

**Aluminum Solders and Flux**

**Flux and Wire for Autogenous Welding**

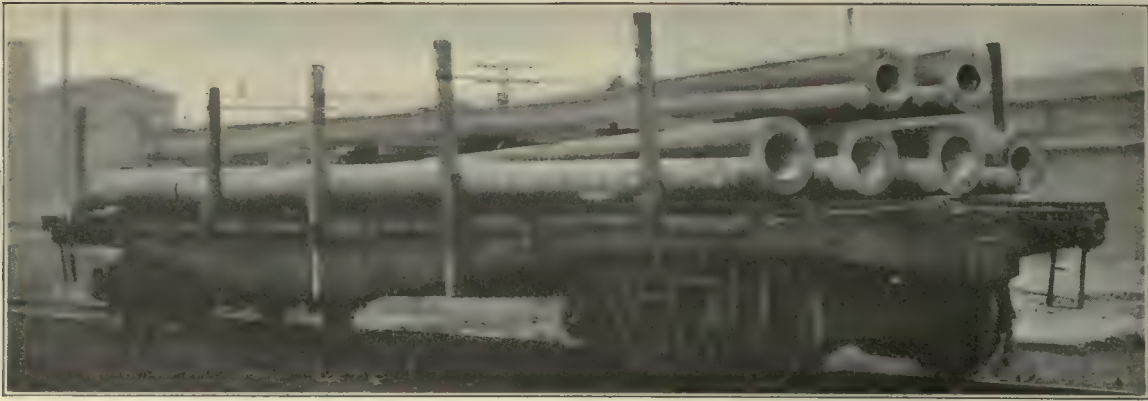
**Bldg., Pittsburgh, Pa., U. S. A.**

of South America, Pittsburgh, Pa.

ENGLAND: Northern Aluminium Co., Ltd., London

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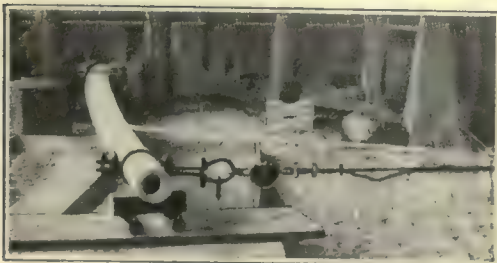
# Massey Reinforced Hollow Concrete Poles

**F**OR *permanence, strength and availability* concrete is one of the most desirable materials for poles.

**No Maintenance Cost**—No painting or surfacing is necessary with Massey Poles.

**No Depreciation**—The quality of Massey Poles improves with age, hence there is no depreciation.

**Strength**—Tests have shown that Massey Poles can be produced to meet the requirements of any service in the electric railway field.



**Flexibility**—The Massey Pole possesses surprising *flexibility* due to its hollow structure.

*Write for further information*

**Massey Concrete Products Corp.**

People's Gas Building, Chicago, Ill.



*24 hours from receipt of  
your order Rome Wire  
will be on its way*

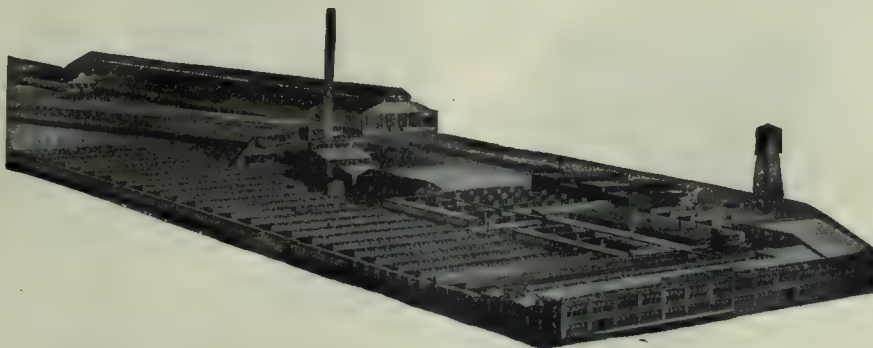
**S**O complete is our stock—so sufficient our facilities and so competent our help that each order is kept moving with surprising speed.

Even your small needs will receive official attention.

To make Rome Wire superior and its cost moderate every possible process is practiced—every modern invention is used in our most modern plant.

Put Rome on Your Buying List for electrical wires.

**Rome  
Wire Company**  
Rome, N. Y.



*All Operations from Wire Bar to Finished Product in this Plant*



# Building for the Future

After a prolonged period during which construction work ceased except for essential war-time requirements, a new era of expansive activity is before the electric railway. It now becomes necessary to build for the future—it holds rich promise for every branch of the industry.

## NEW EQUIPMENT FOR SERVICE

In order to keep service to the public at a high point of efficiency, it must be possible to maintain the pole lines of the Electric Railway in working condition from one year's end to the other.

New construction work and the replacement of inadequate pole lines will involve a considerable investment.

To make this investment wisely, the line construction materials, pole line hardware, construction and linemen's tools must be selected for their service-giving qualities.

This is the type of materials—and the only type—the Western Electric Company is prepared to supply—the type that keeps maintenance costs down to the irreducible minimum.

And ample stocks are available at all times—a fact that will have significance when emergencies must be met.

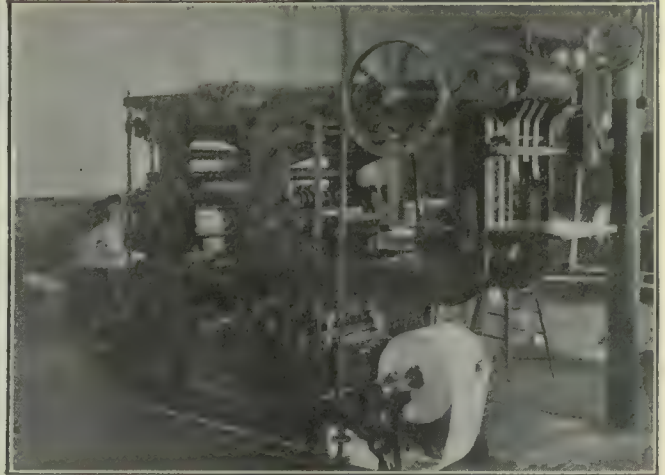


**Western Electric Company**  
INCORPORATED  
Offices in All Principal Cities





Section of United Railways Printing Dept.



Meisel Press in United Railways Plant

*The Printing Department of  
The United Railways of St. Louis  
Cut a 23-Hour Day to 9 Hours  
with a*

# Meisel Rotary Press

The United Electric Railways of St. Louis operate over four hundred and fifty miles of city and interurban lines with about sixteen hundred cars. The daily demand for transfers amounts to approximately 700,000.

To meet this great demand for transfers, the company installed a Meisel Rotary Press a few months ago. This press, running at normal capacity, turns out 240,000 transfers complete, printed in two colors on each side, numbered, dated and folded. The company uses a double transfer—folded back to back. With the new Meisel Press, a 12-in. roll is used and 20,000 impressions made each hour, with 12 transfers per impression. Former

methods required flat sheets 12 x 18 in. and printed 18 transfers to the sheet.

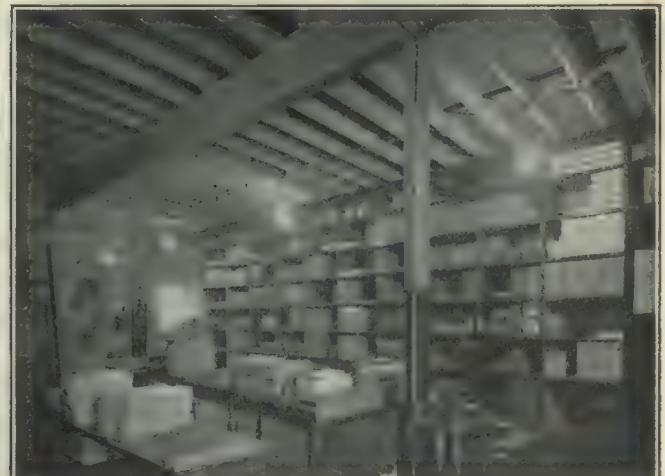
Since the company has installed the Meisel Rotary Press, two folding machines and another press have been shut down and are for sale. Not only that, but the former 23-hour day has been reduced to 9 hours.

Perhaps you are having trouble in getting out the required number of transfers at a reasonable expenditure. Confer with us and let us show you how to cut your printing costs for transfers, bulletins, reports, petitions, etc.

**THE MEISEL PRESS MFG. CO., BOSTON, MASS.**



Stitching Machines of United Railways



Stock Room of United Railways





**Solid Braided Cotton  
Bell and Register  
Cord**

**Samson Spot Trolley  
Cord**

**SAMSON  
CORD**

**T**HE experience of the largest roads in the country shows that Samson Cord is more durable at less cost than other materials, and is far more economical than common, roughly braided cord.

Samson Bell and Register Cord is the same extra quality as Samson Spot Trolley Cord.

Carried in stock in Mahogany, Drab and White. Special colors made to order. Samples and full information are yours for the asking.

**SAMSON CORDAGE WORKS, Boston, Mass.**



# Guaranteed for 60 Years

## Drew



## Pole

## Sleeve

### Which Will It Be — The Junk Pile— Or Years Of Service?

Drew Reclaiming and Protective Pole Sleeves have saved many a weakened steel pole, corroded at the ground line and which otherwise would have had to be replaced.

Replacement is mighty expensive—and entirely unnecessary—when by means of a DREW POLE SLEEVE, any old and corroded steel pole can be reclaimed at one-fifth the cost of a new pole—and with three times its original life.

You can't afford to junk any of your steel poles this Spring.

Our illustrated booklet, "Protecting the Road to Low Maintenance," will interest you.

**DREW ELECTRIC & MFG. CO.**

1016 E. Michigan St., Indianapolis, Ind.



# VICTOR INSULATOR SURANCE

Make it YOUR POLICY  
VICTOR INSULATORS ARE INSURANCE

the same as a fire insurance policy  
is PROTECTION on your home

Did you ever stop to think just what the trade mark on a staple product means?

The trade mark—like "VICTOR" is really an insurance against substitution of inferior goods, it protects both the consumer and the manufacturer.

Whenever you see the trade name VICTOR, you naturally associate it with insulators—you feel a sense of security—that the product bearing that trade mark is up to a recognized standard of excellence—a VICTOR over troubles.



No. 5539  
35,000 V



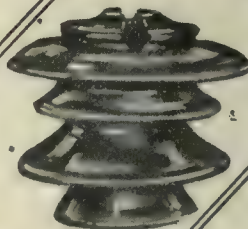
No. 5005  
45,000 V



No. 5090  
60,000 V



No. 5240  
80,000 V



No. 5106  
70,000 V



No. 5353  
50,000 V



No. 5233  
40,000 V

**VICTORS**  
Insure  
your lines  
against losses  
from shutdowns  
due to insulator  
troubles

**VICTORS**  
for all  
voltages from  
27,000 to 80,000  
will give your  
transmission lines  
super-protection.

THE LOCKE INSULATOR MFG. CO., Victor, N. Y.



# CROWN Rail Bonds

Made by  
**American Steel & Wire Company**

Chicago  
New York  
Cleveland  
Pittsburgh  
Denver  
U. S. Steel Products Co.

11000 volt Catenary—Pennsylvania Railroad—Main Line  
Philadelphia—Paoli Electrification

Showing installation of Crown  
Rail Bonds—Two 1 1/2 bonds per  
joint—Each bond has separate  
socket terminal soldered to stub  
end after threading beneath and  
without removing the splice bars.







← A  
**Weed-Clogged  
Track**

**Weeded at a Low Cost**

**65 Days  
Later →**



These are results actually obtained by the use of Atlas "A" weed killer and track preservative as applied by

## The Atlas "A" Weed Killer

The Atlas "A" Method includes complete equipment for the sprinkling of Atlas "A" Weed Killer, the application of Odor Compound for cattle protection, and *the entire supervision of the work* by an Atlas superintendent.

In other words, the Atlas "A" Method is a matter of complete SERVICE, the results of which are guaranteed.

Give us your weedy track, we'll do the rest.

### Don't Wait Until Summer

has come to prove what a costly nuisance a weed-clogged track can be. Atlas Service applied NOW will be a better investment than when traffic increases and delays are costly.

Write now for an estimate of costs for treatment of your track by the Atlas "A" Method, and our booklet, "How to Keep a Clean Track."

**CHIPMAN CHEMICAL ENGR. CO., Inc.**

95 Liberty Street, New York



*Thews are**Everywhere*

## Thews Cut Track Extension Costs

Thew Electric Railway Shovels, with their exact grading ability, speed up and economize maintenance and extension operations.

The Thew pictured is removing old road surface, preparatory to double tracking.

### The Horizontal Crowding Motion

This crowd is famous for economical performance in shallow digging and for its accurate grading ability.

Cutting to grade cuts costs by saving time, labor and money.

Prying dipper action tear up concrete, macadam, track ballast—even old rails and ties.

Swivel dipper arm movement permits digging around manholes, and directly

alongside curbs and existing track beds.

Current consumption is small, as electricity is used only during actual running.

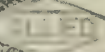
Compact construction minimizes traffic interference. Low overhead enables passing under trolley wires.

Write for Electric Railway Shovel Bulletin giving cost-cutting construction and performance details.

*We manufacture a complete line of Revolving Power Shovels—Electric, Railway, Steam, with dipper ranging from ½ to 2 cubic yards*

THE THEW AUTOMATIC SHOVEL COMPANY, Lorain, Ohio  
New York Office: 30 Church Street

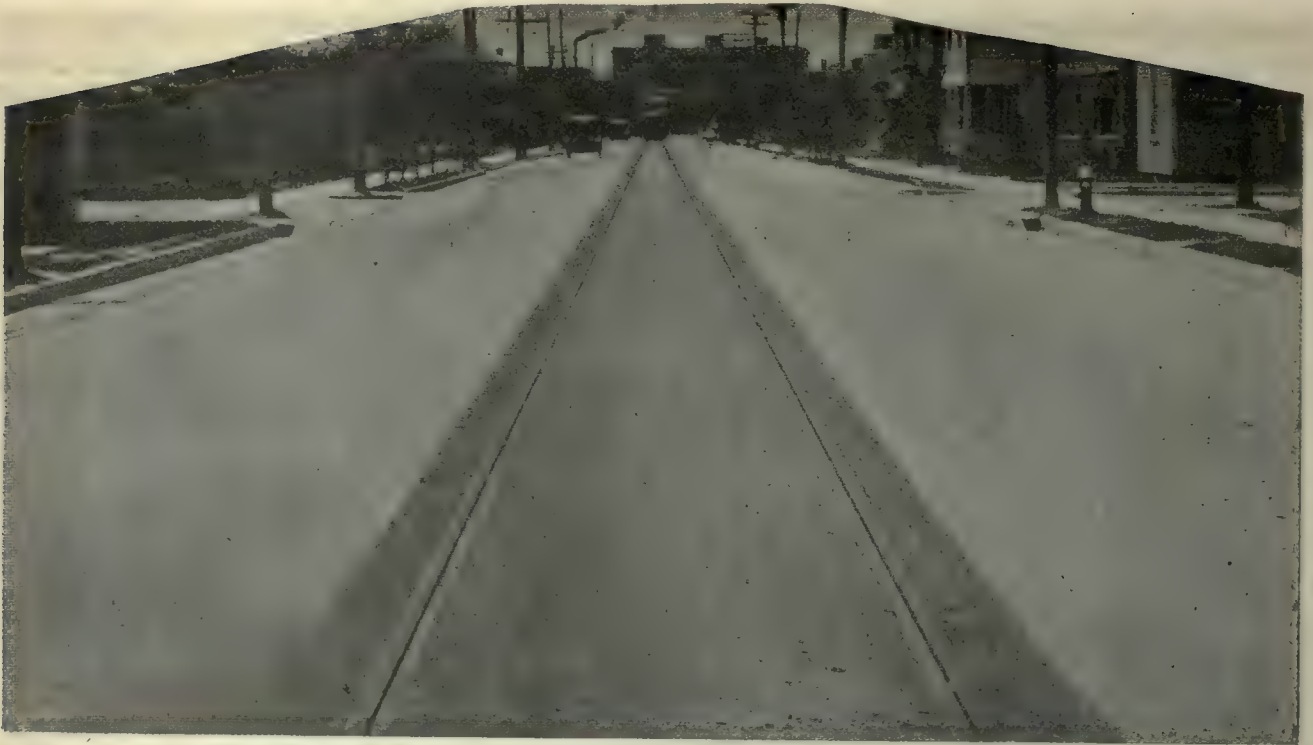
# THEW Power Shovels



Export Department  
ALLIED CONSTRUCTION MACHINERY CORPORATION  
120 Broadway New York U.S.A.







## Which Looks Like YOUR Track?

Has the pavement between your rails "buckled up" like the picture in the circle? Or is your pavement perfectly smooth like that in the larger picture? It is and will remain so if you use

# Nelsonville Filler and Stretcher Brick

The picture in the circle could not be duplicated now. This railway company now uses Nelsonville Brick and has a smooth pavement too. Because the ungrouted joint between the filler brick and the stretcher brick does not transmit rail-vibrations—it effectively prevents any "kick-ups" or displacement of brick in the pavement.

Use of Nelsonville Brick helps, too, in cutting track construction cost—T-rail can be used instead of the more expensive girder rail.

The Nelsonville story is told more fully in our catalogs. Write

## THE NELSONVILLE BRICK CO.

Nelsonville, Ohio



# Some very good reasons for equipping your track with Abbott Rail-Joint Plates



A SIMPLE one-piece forging which strengthens and otherwise improves ordinary angle-bar rail joints and promotes service satisfaction and low maintenance costs by virtue of highly desirable features.

Distributes the wheel load on the two joint ties with about the same action as between a short deck bridge and its piers.

Being a separate part, the plate can be harder and more elastic, and hence afford a stronger support than the steel in the angle bars.

Compels the rails to take first bearing at their ends, because of a slight camber in the plate, and then prevents deflection of the splice bars. This avoids battering of rail ends, harmful wear of splice bars and the tendency of bolts to stretch and nuts to loosen.

The flat end bearings take the place of tie plates and preserve the ties.

The upward corner lugs engage the ends of the angle bars to prevent joints from creeping off the ties, and engage the rail bases to preserve alignment if through accident, the angle bars break or come loose.

The joints may be taken out and rails removed or replaced without disturbing the plates. The plate holding spikes are permanent fastenings.

Smooth running track surface is maintained without constant raising and tamping of joint ties.

Abbott Plates are made in types and sizes for use on any rail section, are suitable for any two tie angle bar joint and may be punched for common or screw spikes throughout or for a combination of both. They are applicable to and equally advantageous on new, relaid or old track.

Write for our booklet "Improved Track Appliances" which describes various types of Abbott Plates and the comparative advantages of each.

## **Lackawanna Steel Company**

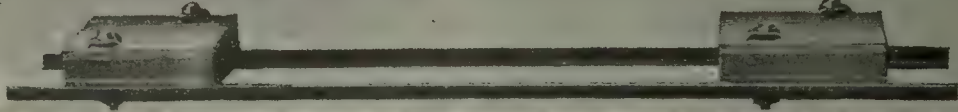
LACKAWANNA, N. Y.

Atlanta Boston Buffalo Chicago Cincinnati  
Cleveland Detroit New York  
Philadelphia St. Louis San Francisco Havana

Sole exporter of our commercial products,  
Consolidated Steel Corporation, 165 Broadway, New York



# The MECHANICAL RAILWAY TIE



## Saving \$1673.13 per Mile



### Excavation for Mechanical Tie

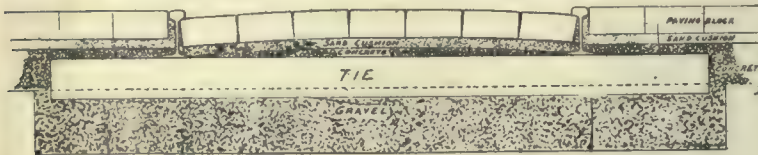
#### Track Construction

7-in. rail  
4 1/2-in. mechanical tie  
6 in. x 1 ft. 6 in. for tie foundation  
Total excavation for track  
11 1/2 in. x 8 ft. 6 in. x 1000 ft.,  
= 302 cu.yd.  
6 in. x 1 ft. 6 in. x 2000 ft.,  
= 55 1/2 cu.yd.

#### Excavation for Paving

4-in. paving block  
1 1/2-in. sand cushion  
6-in. concrete foundation  
Total excavation for paving 11 1/2  
in. x 8 ft. 6 in. x 1000 ft., =  
302 cu.yd.

### Excavation Below Paving Line 55 1/2 Yd.



### Excavation for Wood Tie

#### Track Construction

7-in. rail  
6-in. Tie  
8-in. ballast  
Total excavation for track: 21 in.  
x 8 1/2 ft. x 1000 ft. = 551 cu.yd.

#### Excavation for Paving

4-in. paving block  
1 1/2-in. sand cushion  
6-in. concrete foundation  
Total excavation for paving: 11 1/2  
in. x 8 ft. 6 in. x 1000 ft. =  
302 cu.yd.

### Excavation Below Paving Line 249 Cu.Yd.

with  
**Dayton  
Mechanical  
Ties**

Here is a story—in cold, hard figures—that should be of vital interest to Maintenance-of-way Engineers. It shows enough savings to change many a *deficit* into a *surplus*. Go over it carefully. And then figure also that it means a track with indescribably *smooth-running* qualities—which is one of the best *business-getters* you can possibly have.

## Cost of a 1000 feet of Track

### Mechanical Ties—3-Ft. Centers

55 1/2 cu. yds. Excavation	1.25	69.37
300 Track Ties	2.50	750.00
83 Joint Ties	5.75	189.75
55 1/2 cu. yds. Concrete	6.00	333.00
* Labor		48.00
		\$1,390.12

\$48.00 for labor seems small but it is taken from actual experience with labor at 30c. per hour.

**\$7339.83 Per Mile**

### Wood Ties—2-Ft. Centers

249 cu. yds. Excavation	1.25	\$311.25
249 cu. yds. Ballast	1.50	373.50
500 W. O. Sawed Ties	1.25	625.00
6 Kegs Spikes	8.00	48.00
Labor, Laying Track at 35c. per foot		350.00
		\$1,707.75

**\$9012.96 Per Mile**

Dayton Mechanical Railway Ties are not only a theoretical solution to track troubles. They are the practical outcome of years of work and tests on track carrying both city and heavy, high-speed interurban cars.



## THE DAYTON MECHA

201 Third Street





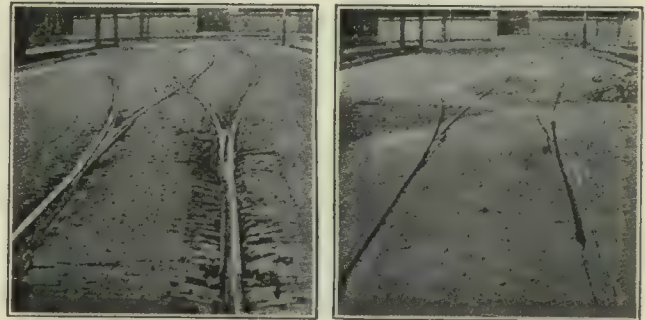
# Rehabilitating the Track

with

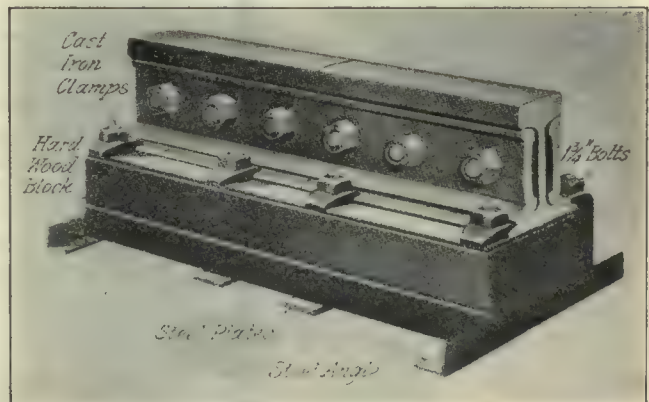
## Dayton Rail Joint Boosters

Here is the old familiar "before and after" picture—and it certainly tells a story! And then—read how it's done.

When a low joint develops, all that is required is the excavation of the track bed surrounding the joint to a depth of 13 or 14 inches below the rail base. The old ties are then cut in two and the ends supporting the joint taken out, the Rail Joint Booster clamped to place under the joint, the rail jacked to correct level and welded to the booster plate, the excavation tamped full of slightly damp concrete and the pavement replaced. The cupped ends of the rails are then built up and ground to surface. Briefly, that's all there is to it!



SECTION OF TRACK BEFORE AND AFTER HAVING  
RAIL-JOINT BOOSTER INSTALLED



THE "RAIL-JOINT BOOSTER"

## More than mere time-saving

Besides the utility of the process of doing the rebuilding without "killing" the track undergoing repair, the low cost of the material used, the small labor cost for doing the work and the utilization of the old rail are highly desirable under present labor and material shortages.

We know just what the Dayton Rail Joint Booster will do.

We know it provides a positive means for correcting low rail joints quickly, effectively and economically. We've seen joints that looked hopeless fully rehabilitated by its simple use.

It will pay every man interested in maintenance of tracks to make a test installation.

Order a Dayton Rail Joint Booster today. Install it in accordance with the complete instructions which will accompany it, under the very worst rail joint in your tracks. Its effectiveness will convince you that it will pay you to use Dayton Rail Joint Boosters exclusively for rehabilitating sunken and uneven rail joints.

# MECHANICAL TIE COMPANY

Arcade, Dayton, Ohio







1



2



3

# Obliterating with THERMIT

Poor track resembles the English sparrow in one respect—before you realize, you have a new generation of a lot of new rails, and the slightest unevenness or roughness in your joints means that the days are numbered to the necessary arrival of your next rail generation.

*This is not mere talk.* We can confidentially supply particular instances where premature deterioration of defective joints is costing the railway companies hundreds of thousands of dollars more than necessary in track replacements and repairs.

Experts have declared that the condition of the track is a very vital factor in successful or unsuccessful car operation. Poor track is the cause of car and truck troubles, while leaky joints cause insufficient power supply, delaying schedules and eating big holes in the coal pile.

*The large photograph below shows the gap between the rails. It must not be "jointed." It must be obliterated. Small pictures Nos. 1, 2 and 3 show initial steps in the Thermit Process—driving in the insert, applying asbestos strips and filling in the grooves.*



## Metal & Thermit Corp.

Successors to Goldschmidt Detinning Co. and  
the Goldschmidt Thermit Co.

120 Broadway, New York

# For Smooth Track and



# the Rail Joint Insert Welds

The *Thermit Insert Weld* is the only logical method to stem the tide of track renewals and car equipment repairs because it establishes a *perfectly smooth rail connection* which is as *strong and lasting* as the rail itself.

Don't you think your *passenger revenue* is going to slump when, due to *battered track joints*, traffic must be rerouted, travel disarranged and destinations made difficult to reach?

If the above conditions prevail, won't the "passenger revenue" figures in your accounting books become insignificant? On the other hand, won't your accountants finish their day's work with writer's cramp from littering up the "maintenance" pages?

Thermit Insert Welds by obliterating track joints, obliterate these obstacles to increased revenue and low maintenance costs.

## Agents

329-333 Folsom St., San Francisco.  
15 Emily St., W., Toronto, Ont.  
7300 So. Clinton Ave., Chicago.  
1427-1429 Western Ave.,  
Pittsburgh, Pa.

Factories located at Chrome,  
N. J.; Wyandotte, Mich.;  
East Chicago, Ind.; Jersey  
City, N. J.

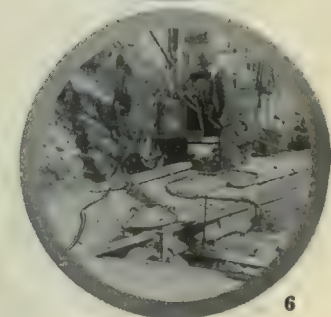
Here is the crucible containing the Thermit mixture ready to swing over the mold, which has been rammed, adjusted to the rail, and preheating operations started, as shown in pictures 4, 5 and 6.



4



5



6



## Smothered Maintenance Costs



# Obliterating with THERMIT



7



8



9

*Here is the Thermit being poured, obliterating the rail joint. The small pictures 7, 8 and 9, show two operations immediately preceding this reaction, and the removal of the mold afterwards.*

Years of experience gathered from the successful application of Thermit rail welding to city track all over the United States, from New York and Boston, on the Atlantic, to Los Angeles, on the Pacific, and from Milwaukee, Chicago, Youngstown and Pittsburgh to San Antonio near the border, in all extremes of climate and temperature, show that this method of obliterating the track joint is the only solution of the biggest track problem.

The Thermit Method completely *welds* the two ends of the rail together by an instantaneous amalgamation of liquid metal. The division between the rails is not "bridged." The rails are not "jointed." They are made *ONE—one continuous, homogeneous rail*, in which the welds fully equal, if not actually exceed, the rail in *life, mechanical strength and electrical conductivity*. There will never be any joint troubles in the future, because you can't have joint troubles when you haven't any **JOINTS!**

**Metal & Thermit Corp.**

Successors to Goldschmidt Detinning Co. and  
the Goldschmidt Thermit Co.  
120 Broadway, New York

*You Don't Have to Keep  
Because there are no*



# the Rail Joint Insert Welds

Just how simple the standardized Thermit Process is—how quickly it is accomplished *without more than nominally interrupting traffic*—we are prepared to show you by means of

## **Moving Pictures**

We are ready to send a man to project these pictures *on your office wall*. The film shows every detail, from aligning the two ends of the rail to removing the grinder from the track and letting cars go by over the continuous rail. The pictures illustrating this advertisement were taken from this film. This "movie" will SHOW you how Thermit Welds can be made successfully by your own men. It is a real "drama," in which that villain "HIGH COST OF MAINTENANCE" is foiled—twenty minutes of the most absorbing interest you ever spent in your life. Book your office for a visit from the Thermit Movie-Man!

### **Agents**

329-333 Folsom St., San Francisco  
15 Emily St., W. Toronto, Ont.  
7300 So. Clinton Ave., Chicago.  
1427-1429 Western Ave.,  
Pittsburgh, Pa.

Factories located at Chrome,  
N. J.; Wyandotte, Mich.;  
East Chicago, Ind.; Jersey  
City, N. J.

Here is a close-up view of the finished continuous rail. Pictures 10, 11 and 12 show the weld immediately after removal of the mold; the grinding operation; and the replacing of the paving.

# Track of the Joints Joints in the Track!



10



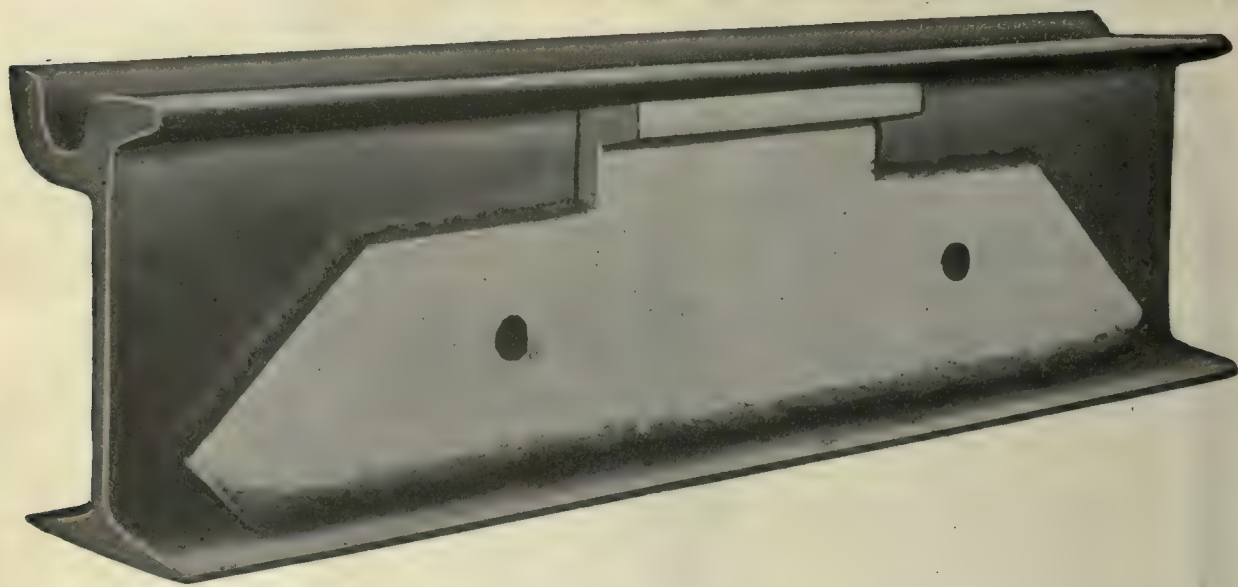
11



12



# The very foundation of is the condition of the



## Indianapolis Joints make old rails equal to new

Poor car service—irregular schedules and delays only militate against your securing that justifiable increase in fare revenue. Rails reinforced at the vital spots with Indianapolis Welded Joints insure better car service and lowered equipment maintenance and power reduced costs—all around.

Tests of Indianapolis reinforced rails by the U. S. Bureau of Standards show less than .02 inch deflection at maximum wheel load and an actual conductivity of 138 per cent. compared with unbroken new rail.

Do you wonder why hundreds of leading railway companies have permanently adopted this method of doubling the present life of their rails?

“Indianapolis” Joints are adapted to severe, continuous service under varying conditions; they reinforce the rails at the vital spots; they are made of the strongest, toughest materials and are designed and built in accordance with highest engineering skill and accepted railroad practice. Hundreds of railway companies are using them with extremely satisfactory results.

## Indianapolis Switch & Frog

---



# Satisfactory Car Service rails—Says an expert



## The INDIANAPOLIS WELDER rebuilds worn track and special work

The Indianapolis Welder will build up the weak spots in your old rails in a short time, making cupped rails, broken frogs, switches, cross-overs, joint plates, etc., as good as when new.

Indianapolis Welders are cheap, for the first cost of the equipment is paid for inside of 60 days—and the operating costs, including labor, current and steel, amount to only 1 to 2 per cent. of the value of the reclamation.

Indianapolis Electric Welders, Simplex and Apex Welded Joints and Fluxated Welding Steel are used on 90 per cent. of the important electric railways of

the country. They have been responsible for an annual saving of \$2,000,000 since they were introduced in 1912.

As a matter of economy the need for Indianapolis Joints and Portable Electric Welders has never been greater than right now. They have doubled the life of rails for hundreds of leading railways.

We will gladly furnish complete details.

Manganese Frogs and Crossings can be reclaimed by Electric Welding—if they are **gone**. Let us figure on your requirements. We have a dependable product at attractive prices.

# Company, Springfield, Ohio



# "GIANT HEEL" Switch

*Large diameter, deep cylindrical Heel resting on Manganese Steel surface, with adjustable holding device.*

All bearing surfaces carefully ground.

Furnished in either Manganese Steel Centre or Solid Manganese Steel construction.

Specify this switch for your next layout and watch its service.

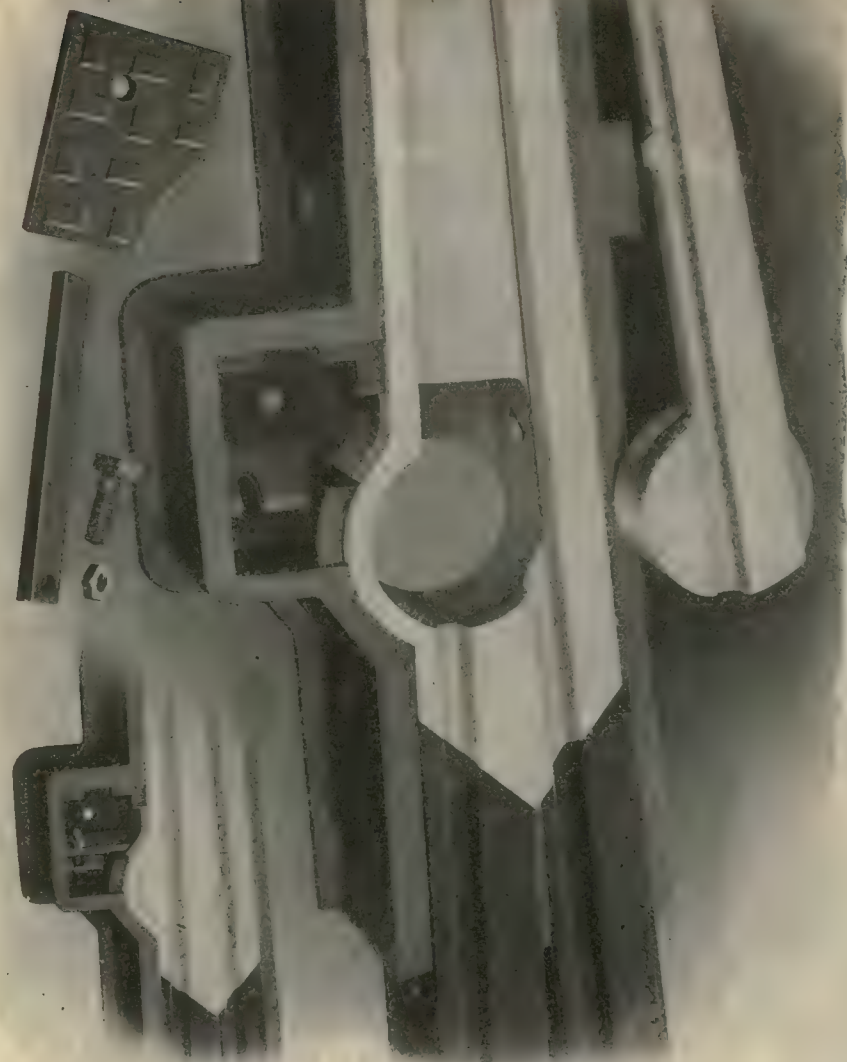
*Write for complete data.*

**Wm. Wharton, Jr. & Co., Inc.**  
Easton, Pa.

*Subsidiary of*

**TAYLOR-WHARTON IRON &  
STEEL COMPANY**

Other Plants { Taylor-Wharton Iron & Steel Co., High Bridge, N. J.  
Philadelphia Roll & Machine Co., Philadelphia, Pa.  
Tioga Steel & Iron Co., Philadelphia, Pa.




# WHARTON

Electric, Steam and Industrial  
**TRACK WORK**



# Lincoln Dynamotor

## Portable Bonder and Welder



The Lincoln Dynamotor is a special type of arc welder operated by electric current from the trolley wire.

### For Bonding

It affixes rail bonds by thoroughly fusing and welding them to the rail by means of the electric arc.

### For Shop or Track Welding

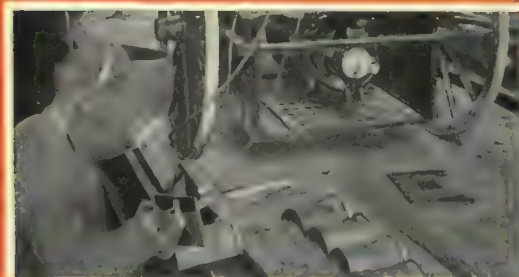
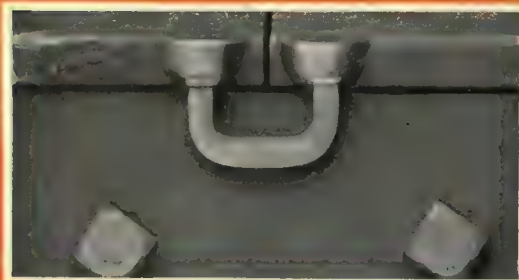
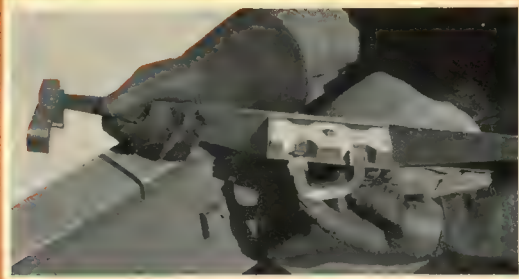
It is used for a wide range of shop repair work, broken gear cases, worn armature shafts, etc. It builds up worn rails, frog crossings, etc., and takes care of all welding required for track maintenance.

**The Lincoln Bonding Company**  
CLEVELAND, OHIO





# Applying Rail Bonds with the Lincoln Dynamotor



**The Lincoln Bond** is a flexible "U" shaped bond made of laminated copper or stranded cable.

During the welding operation the terminals of the bond are slipped into a carbon and copper mold which serves to hold the molten metal.

**The mold** and bond are tightly clamped against the head of the rail—no cleaning of the rail is necessary. The terminals of the bond and head of the rail are then perfectly fused, intermixed and firmly welded together by the carbon arc. The actual welding period for a bond is less than one minute.

**Our customers** are putting on an average of 15 bonds per hour. The bond can never loosen or rust and insures perfect electrical conductivity as long as the rail lasts.

This bond costs less, lasts longer, requires less time and gives a better circuit than any other system.

Upon request we will demonstrate Lincoln Bonding on your lines.

## Shop Welding with the Lincoln Dynamotor.

Breakage or wear of metal parts can be quickly repaired by filling in new metal, then machining if necessary to proper sizes.

**The Lincoln Bonding Co.,** 636 Huron Road  
Cleveland, Ohio, U. S. A.

LINCOLN BONDING COMPANY, 30 Church Street, New York City  
CHARLES N. WOOD COMPANY, 14 Federal Street, Boston, Mass.  
RAILWAY TRACK WORK COMPANY, 30th and Walnut, Philadelphia, Pa.  
ELECTRICAL ENGINEERING & MFG. CO., First Nat. Bank Building,  
Pittsburgh, Penn.

CHATTANOOGA ARMATURE WORKS, Chattanooga, Tenn.  
W. L. ROSE EQUIPMENT COMPANY, LaSalle Building, St. Louis, Mo.  
BURTON R. STARE COMPANY, Yesler Way, Seattle, Wash.  
A. A. WIGMORE, 441 Pacific Elec. Bldg., Los Angeles, Calif.  
HOLDEN & WHITE, Fisher Building, Chicago, Ill.



# Yours for the Asking



## Valuable to Every Electric Railway Official

Packed into the 280 pages of this book is valuable information regarding track construction and maintenance, so varied and complete as to make it an indispensable handbook. Useful data and tables, mostly original, with some taken from standard works, cover a wide range of track problems. Instructions are also given for ordering frogs, crossings, switches, turn-outs, etc. There are over 200 designs, diagrams and illustrations. Size 5 x 7 inches, cloth bound. Sent free on request. Use the coupon.

**St. Louis Frog & Switch Co.**  
St. Louis, Mo.

***This Coupon Brings  
Your Copy Free and Postpaid***

St. Louis Frog & Switch Co.,  
St. Louis, Mo.

Gentlemen: Please send, postpaid, a copy of your  
Catalog and Railway Hand Book.

Name .....

Position .....

Company .....

Street .....

City .....

State .....





## 15 to 40 per cent increase in track life by keeping joints smooth

The engineer of maintenance of way of a large traction company said sometime ago:

"If we start with the new track and keep the joints planed we will increase the life of track from 15 to 40 per cent and at the same time will effect a saving in the cost of making repairs which will be necessary if the track is allowed to just 'run along.'"

## Reciprocating Track Grinders

provide an efficient and economical means of grinding joints in newly laid track to a perfect condition of smoothness, of grinding out "cups" which may later appear at joints and of eliminating rail corrugations wherever that disease appears.

An increase of even 15 per cent in the life of track means a big return on the relatively small investment necessary for track grinding. Besides which there are many other advantages in keeping track in continuously good condition.

**RAILWAY TRACK-WORK COMPANY**  
30th and Walnut Sts., Philadelphia



# I-T-E CIRCUIT BREAKERS

**It is Now Generally Recognized That I-T-E Circuit Breakers Make For Economies In Installation and Operation.** Careful study of special or local conditions must be made to the end that the contemplated installation may embody the latest form of apparatus best suited to the individual requirements.

**I-T-E Circuit Breaker Engineering and Apparatus Is Superior Beyond Comparison,** and those who avail themselves of our services secure the benefits of years of special training and experience.

**THE CUTTER COMPANY**  
PHILADELPHIA



# Why Not Cut Your Coal with *Blaw Buckets*

No matter  
what your condi-  
tions, there is a "BLAW"  
to fill them.

First, the "BLAW" SPEEDSTER: The fastest and most sturdily built rehandling bucket made. You will find it ideal for handling your coal and for use on track reconstruction.

Second, the "BLAW" SINGLE LINE: The practical bucket for hooking on to cranes or derricks ordinarily used for other purposes. You can leave it at your coal pit and use it with any power equipment available without changing lines.

Third, the BLAW POWER-WHEEL: A small light weight bucket of the "bul'-wheel" type. By a unique arrangement, an extra large wheel is used, obtaining great closing power.

*We shall gladly send illustrated literature. Full details on request.*

## BLAW-KNOX COMPANY

605 Farmers Bank Bldg., Pittsburgh, Pa.

New York, 165 Broadway  
San Francisco, 630 Monadnock Bldg.  
Chicago, Peoples Gas Bldg.  
Foreign Sales Representatives  
Gaston, Williams & Wigmore  
Inc., 39 Broadway,  
New York City

### PRODUCTS

"BLAW" FORMS  
"BLAW" BUCKETS  
FABRICATED STEEL  
TRANSMISSION TOWERS  
FURNACE EQUIPMENT  
BLAW MIXERS  
PLATE  
WORK



# Rehandling Costs ?

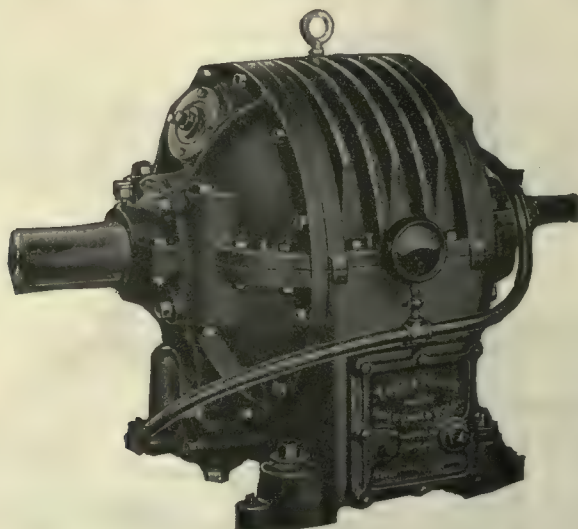


## PRODUCTS

BLAW FORMS  
BLAW BUCKETS  
FABRICATED STEEL  
TRANSMISSION TOWERS  
FURNACE EQUIPMENT  
BLAW MIXERS  
PLATE  
WORK



# *The Logical Drive for*



## TURBO GEAR

**I**N THE electric railway power plant the prime movers are almost invariably high-speed electric motors or steam turbines. But auxiliary apparatus, such as stokers, fans, blowers, condensers, conveyors, pumps and compressors usually operate at relatively low speeds, and thus give rise to a demand for a reducing drive.

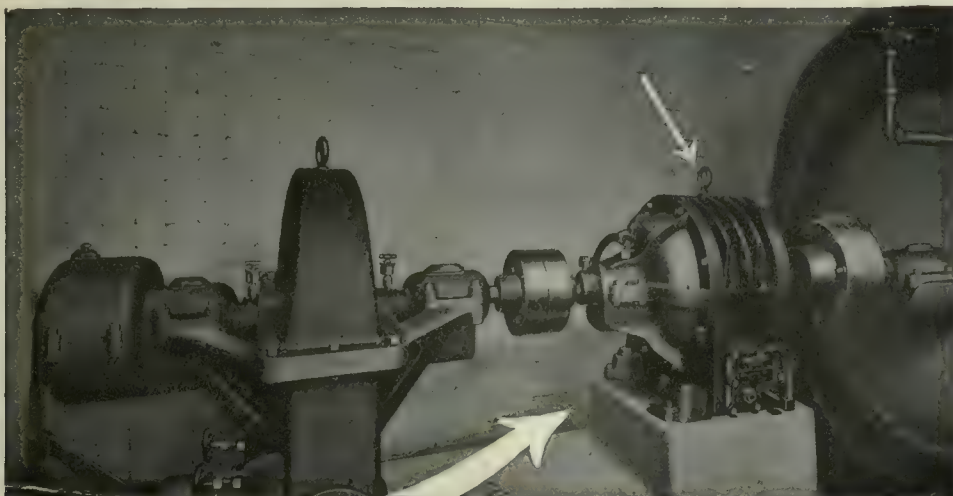
Turbo Gear claims your consideration as the most logical solution of any speed-transforming power transmission problem arising within the power station, for

the convincing reasons presented on the opposite page.





# Power Plant Auxiliaries



High speed steam turbine (3400 r.p.m.) driving condenser at 425 r.p.m. through a direct connected 50 H.P. Turbo Gear.

TURBO GEAR is a self-contained mechanical power transmission consisting of double helical herringbone gears so arranged within a substantial housing that over 98% efficiency is maintained in changing speeds at any ratio greater than 4 to 1.

Note especially that the speed may be changed in either direction—it may be reduced or increased relatively to the speed of the prime mover, simply by turning the Turbo Gear end for end.

The low-speed shaft of the Turbo Gear lies in the same axial line as the high-speed shaft, consequently

the transmission is pure torque, and side-strain is absolutely eliminated.

Consider also the facts that no belts, chains, sprockets or exposed gears are used, that a very small floor space is required, and that it can be used even in wet, dirty, dusty or gritty places because it is totally enclosed.

Lubrication is of the self-contained force feed type. Once properly set up no subsequent adjustments of the gear are necessary. It is always in running condition.

*Have you a copy of Bulletin 101 in your files?  
If not send for one today—free.*

## The Poole Engineering & Machine Company

Manufacturers of Gears and Power Transmission Machinery Since 1843  
Baltimore, Maryland, U. S. A.

CHARLOTTE, N. C. .... Realty Bldg.  
CHICAGO ..... Old Colony Bldg.  
DALLAS ..... 1405 Southwestern Life Bldg.  
DENVER ..... First National Bank Bldg.  
DETROIT ..... 423 Dime Bank Bldg.  
EL PASO ..... 615 Mills Bldg.  
NEW YORK ..... 50 Church St.

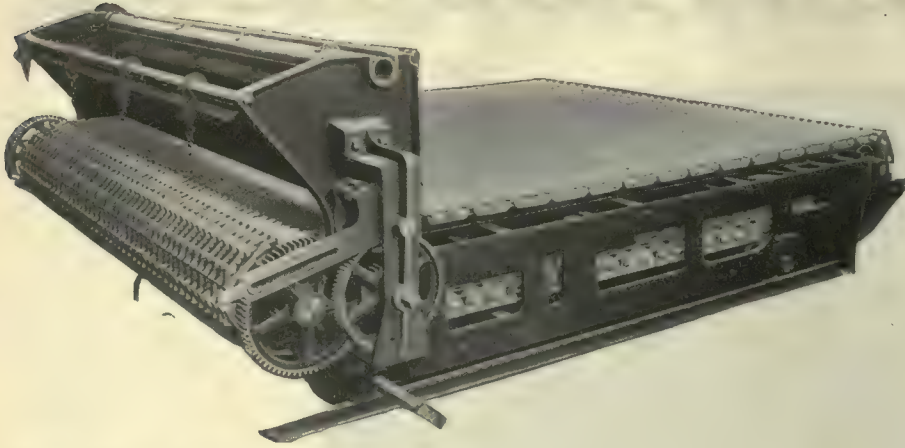
PHILADELPHIA ..... 929 Chestnut St.  
PITTSBURGH ..... 781 Union Arcade Bldg.  
ST. LOUIS ..... 2211 Olive St.  
SALT LAKE CITY ..... 914 Boston Bldg.  
SAN FRANCISCO ..... 503 Mission St.  
SEATTLE ..... 2012 L. C. Smith Bldg.

### SOLE CANADIAN REPRESENTATIVES:

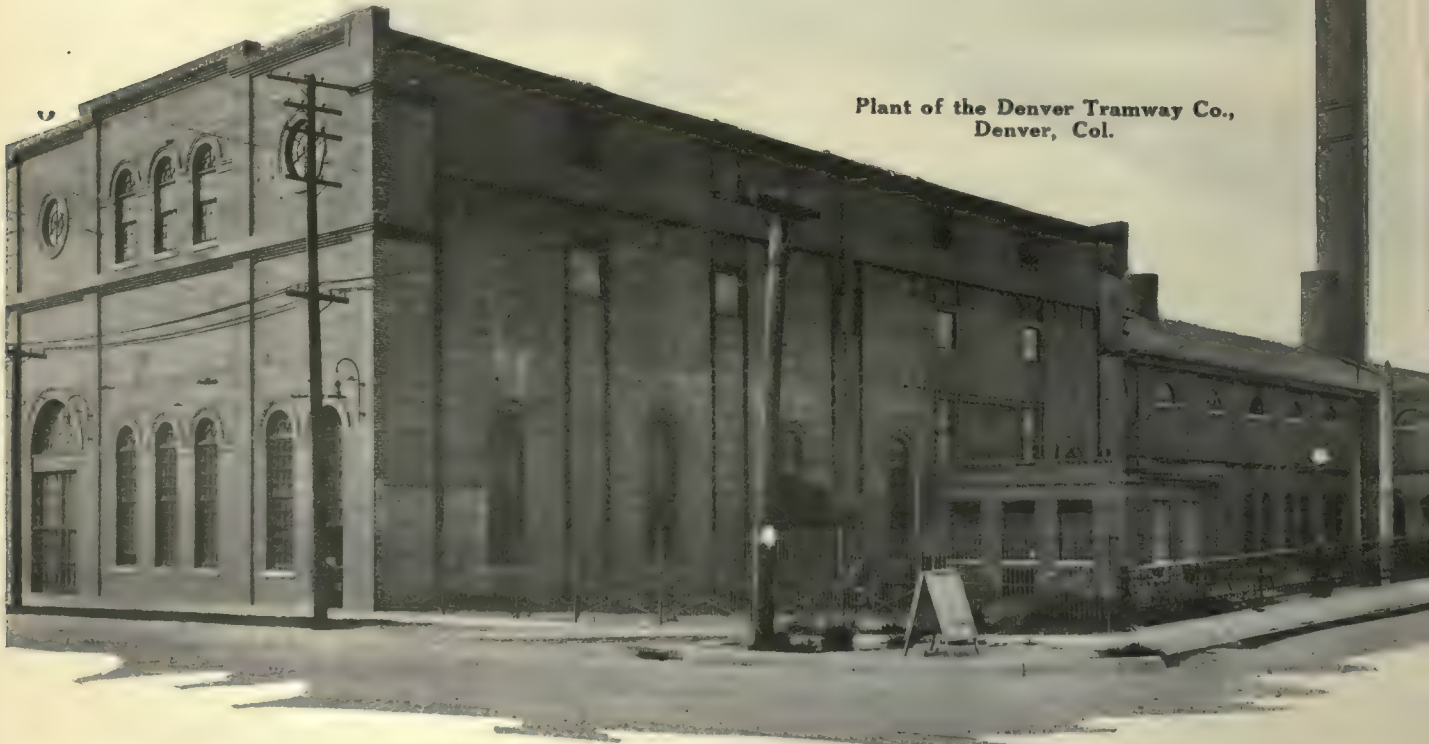
The Canadian Fairbanks-Morse Co., Halifax, St. John, Quebec, Montreal, Ottawa, Toronto, Hamilton, Windsor, Winnipeg, Saskatoon, Calgary, Vancouver, Victoria.



# 275% of Rating



Green Chain Grate "K"  
Type used in the Denver  
Tramway Plant.



Plant of the Denver Tramway Co.,  
Denver, Col.

**Backed by 21 Years of  
Specialized Experience**

GREEN Sealflex Arches  
GREEN Pressure Waterbacks  
GREEN Steam Jet Ash Conveyors  
GREEN Materials Transfer and  
Storage Hopper

# GREEN



# Burning Lignite Coal

The Denver Tramway Co.'s power plant sets the standard for the district in which it is located. They swing 275% of rating for the peaks and 225% of rating is maintained twenty-four hours a day — seven days a week. Despite the fact that an extremely low grade of fuel is burned—Colorado Lignite—no periodical cleaning of fires is necessary and over-all efficiency up to 76% is obtained — 14% CO<sub>2</sub>.

The long, Green Sealflex Arches which make possible this remarkable performance of Green Chain Grates, are typical of the care taken by Green Engineers to adapt furnace design to the fuel and load conditions of individual plants.

Green Engineers have at their com-

mand data accumulated during 21 years of experience; facts that enable them to give the proper type of Green Chain Grate the operating advantages that assure superior performance — **sustained** high capacity with minimum labor, and fuel economy though burning the cheapest local coals.

---

*Driving engine requires 30 lb. steam per hour for largest stokers — no other steam consuming auxiliaries.  
No clinkers—least attendant labor.*

---

## Green Engineering Company

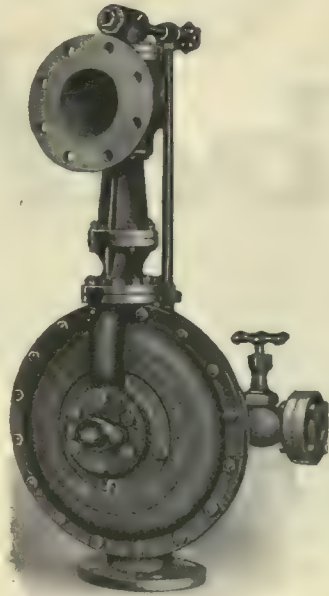
*Main Office and Shops:*

East Chicago, Indiana

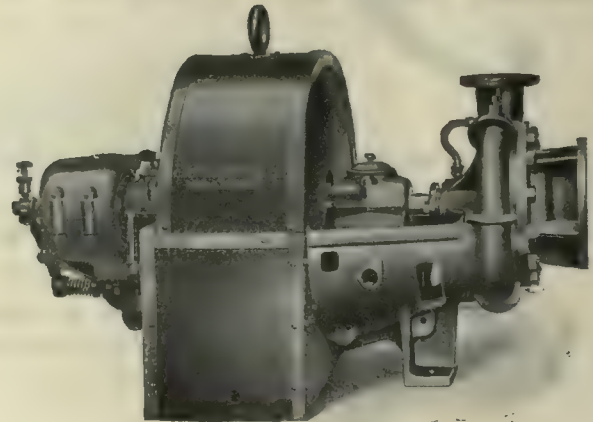


**CHAIN GRATES**  
"K" Type for Clinkering Coals      "L" Type for Coking Coals

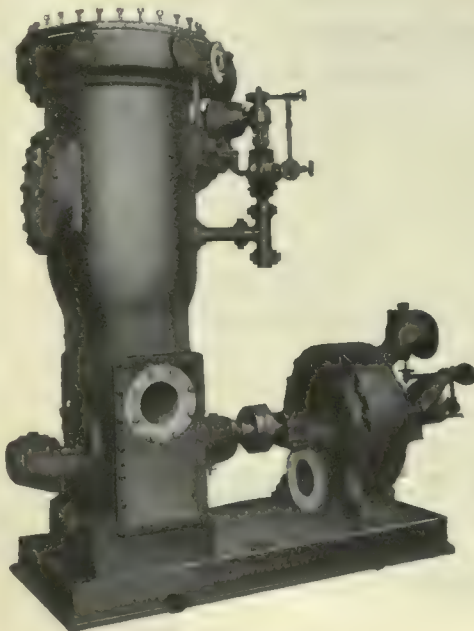




RADOJET



Turbine Driven Hotwell Pump



RADOJET on Low Level Jet Condenser

High Vacuum, Low Steam Consumption, Extreme Simplicity, No Moving Parts, No Lubrication, Minimum Weight, Minimum Space, No Foundation, Noiseless Operation, Quick Starting, Continuous Service.

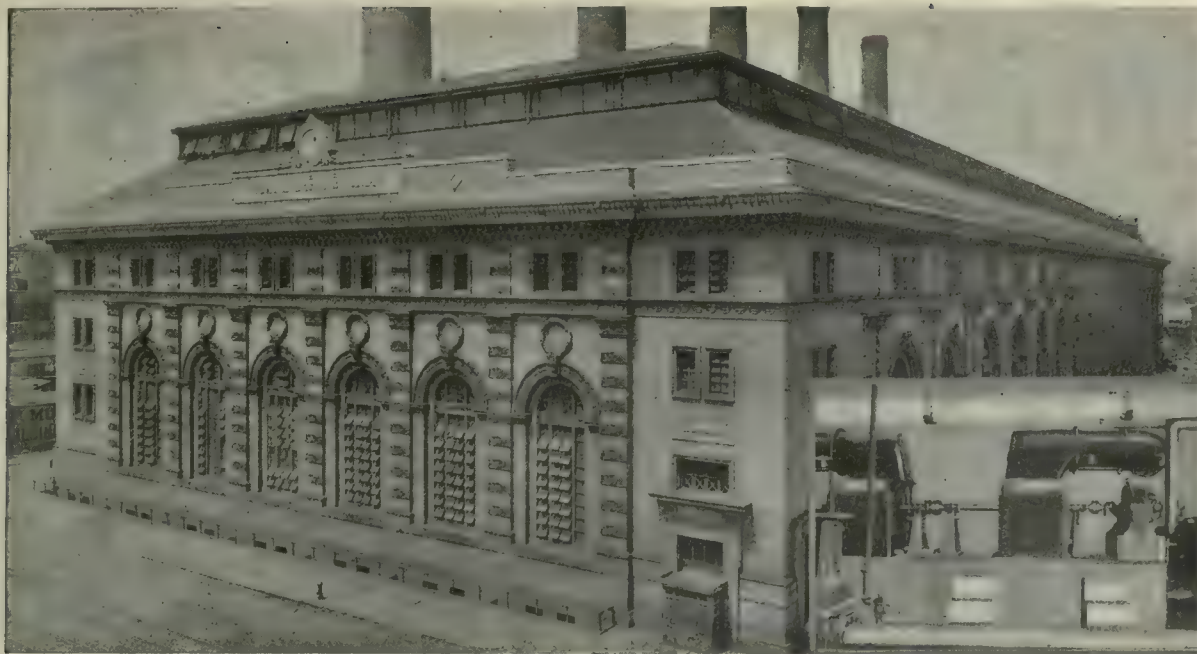
*We specialize in design and construction of condensers and auxiliaries.*

**C. H. Wheeler Manufacturing Company**  
Main Office and Works: Philadelphia, Pa.

Branch Offices:

New York    Boston    Pittsburgh    Chicago    Seattle    San Francisco    New Orleans    Charlotte





59th ST. STATION INTERBOROUGH RAPID TRANSIT CO.

## The World's Greatest Traction Company Profits by the Terry

The Interborough Rapid Transit Company of New York handles about eight hundred million passengers a year.

This is said to be the safest railway in the world, and reliability is the keynote for all equipment furnished.

That's one reason Terry Turbines were selected for driving the forced draft fans and the hot well pumps.

The Interborough has 23 Terrys in operation. For their reliability, accessibility, and low upkeep cost traction companies all over America use Terry Turbines.

For a detailed description of the Turbine and its applications write for Bulletin 24. Read it and learn why so many engineers advise.

*Specify Terry for Driving Your Auxiliaries*

**The Terry Steam Turbine Co.**  
Hartford, Conn.

# TERRY TURBINE DRIVE

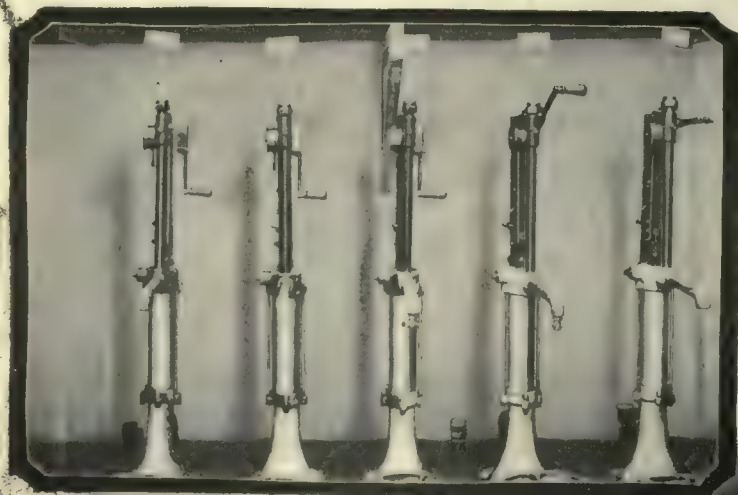


# *This up-to-date G&B Oil Handling Outfit Saves Time, Labor, & Money for the Boston Elevated Railway Co.*

In the Spring of 1916 the Boston Elevated Railway Co. installed a Gilbert & Barker Oil Storage System in their Eagle Street Car

House. This outfit consists of five sturdy storage tanks of 150 gallons capacity each and five hand-operated automatic measuring pumps. The tanks are located in the car house basement at level of pit floor.

Each tank is piped to a self-measuring pump in the oil delivery room near level of the car tracks in yard. In front of each pump is a separate screened drip funnel and a filling funnel with flush covers.





This handy installation has given very satisfactory service. It avoids waste and seepage attendant with leaky barrels and reduces fire hazard to the irreducible minimum. The ease of draining barrels into tanks, the quickness of drawing oil—on a recent test one gallon of compressor oil was drawn in four seconds—are additional valuable features making for economy of labor.



This G&B installation is typical of scores of others with Electric Railway Companies. The great saving in time, labor and oil and

the elimination of the fire hazard commend this modern Gilbert & Barker Pumps and Tanks Outfit to every up-to-date traction company.

Today is a better day than tomorrow to write for facts and figures. Bulletin 60 will bring them.

## GILBERT & BARKER MFG. CO.

(Established 1865)

Springfield, Mass., U. S. A.





# Greatly Increased Mileage from each Journal Box Packing



## Operation

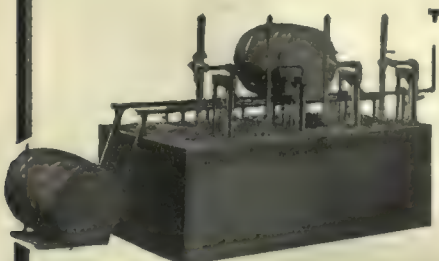
Referring to the accompanying cut. The oil is kept in the lower compartment and the upper compartment is filled with waste. The oil is then drawn from the lower compartment by means of the pump, and the waste is completely submerged in oil. It is left saturating for 18 or 24 hours. The handle (b) is then turned and the oil drains thru the screen (d) and back to the lower compartment thru the valve (e). After the waste has drained for about 24 hours it has reached a degree of perfect saturation which means 100% more mileage. The removable gauge stick (a) shows the quantity of oil in the lower compartment. The opening (e) is for cleaning or inspection.

## By using the Milwaukee Waste Saturation System

you can avoid the troublesome and costly hot box and realize 10 to 15 thousand miles on a single journal box packing, at a substantial saving of oil.

Constant lubrication is assured by the method of saturating the waste. Thorough lubrication makes possible a saving of at least one-third on journal box maintenance.

## Milwaukee Outfits Cut Your Oil and Labor Expense



We manufacture 30 different types of outfits for the economical storage and handling of such liquids as machine oils, cutting oils, kerosene, gasoline, etc. A Milwaukee Outfit will save you from 5 to 10 gallons of liquid on every barrel you use.

Write for our catalog of complete oil storage systems for Railways.

**Milwaukee Tank Works**  
Milwaukee, Wisconsin







## This Sort of Thing is Ended

The photograph was taken during a recent comparative test of Fuses. It reveals the violent action of the usual type of fuse in opening a high-capacity short-circuit.

Under identical conditions, the new "FRANKLIN" Fuse opened the circuit without flash, flame or violent action of any kind.

Before proceeding with the line extension you have in contemplation, investigate the advantages of this new type of fuse.

The "FRANKLIN" Fuse is non-destructive and renewable, yet absolutely positive in opening short circuits of high capacity. Its radical departures in principle from former types have so successfully eliminated explosion forces that it has been possible to seal it completely in its container.

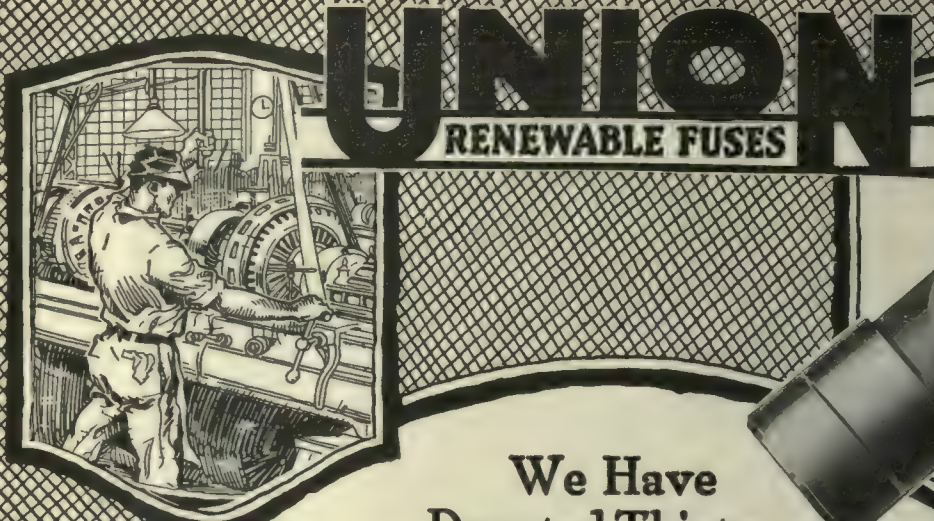
The Fuse-box is of skeleton construction, with panels of asbestos lumber. If desired, the Fuse may be withdrawn by opening the door.



SELLING AGENTS  
**THE PHILADELPHIA ELECTRIC  
COMPANY SUPPLY DEPT.**  
132 South Eleventh Street  
Philadelphia







## We Have Devoted Thirty Years of Thought and Labor to the Manufacture of Fuses

The "UNION" Renewable Fuse and the "UNION" Renewal Link are the results of this extended effort.

It will take us less than thirty minutes to demonstrate their absolute superiority and show how to reduce your present fuse maintenance costs.

Attention to detail is a big thing in the superiority of "UNION" Renewable Fuses. That little bend in the ferrule type element, for instance, is a small thing but it insures the proper centering of the figures under the window in the cap.

That's what the window is for, but it used to require considerable time and skill to get the old style straight element bent at just the right point. Try it and see. In "UNION" elements one end is bent right—the other can't go wrong.



This is just one of the details worked out by the makers of "UNION" Renewable Fuses to simplify their use. That's why they are fool-proof—why they outlive all other fuses. That's why we say, regardless of what other renewable fuse you are now using, "UNION" Renewable Fuses and "UNION" Links will reduce your present fuse maintenance costs.

Electrical dealers everywhere sell "UNION" Renewable Fuses and "UNION" Renewal Links. Order a trial installation today.

# Chicago Fuse Mfg Co.



Renewable and Non-Renewable Fuses  
**Chicago New York**







# Splicing - TAPE - Friction



**T**O withstand severe operating conditions in the electric railway field, friction and insulating tape must be of the highest grade and thoroughly dependable.

United States Tapes meet every service requirement. Their uniform good quality is maintained by the best of raw materials and workmanship.

"Holdtite" Friction Tape and "Buckeye" Splicing Compound have long been leaders in their line. Include them in your orders for supplies.

"A Tape for Every Trade and Purpose."

## United States Rubber Company





## A Higher Rate of Fare will be Gladly Paid for Better Car Service

P & B Weather-proof Tape will minimize the cost of frequent feeder tape repairs with their energy waste and traffic disturbance.

It will not disintegrate under the greatest variations of weather and temperature. Retains its flexibility—will not dry out and is the most durable tape known. *Try it and be convinced.*



P & B Baking and Air Drying Varnishes promote the most reliable carservice. These varnishes are exceptionally tough and reliable for armatures, field

coils and transformers.

For better car service be sure to use P & B Varnishes and P & B Tape. *Send for descriptive matter.*

### The Standard Paint Company

Woolworth Building, New York  
Boston Chicago





# TOLEDO

## Lifting a Motor like a box of matches!

One of the thousands of instances of the ways in which Toledo Cranes can *cut costs* for Electric Railways.

And cost cutting *must go on*. The billions of credit still to be extended to our Allies means *increasing demands* upon our manufacturing facilities in *every field*—which means maximum demand for transportation *all over* the country. The part of the Electric Railway Companies is to meet this demand—and profit from it.

One of the biggest factors in economical efficient railway operation is the service that can be rendered by Toledo Cranes in the Railway Shops and Power Houses.

**The Toledo Bridge &  
Crane Co.**  
Toledo, Ohio

New York Office,  
52 Broadway  
Philadelphia Office,  
2013 Market St.  
Pittsburgh Office,  
203 Oliver Bldg.

Cleveland Office,  
725 Citizens Bldg.  
Chicago Office,  
549 Washington Blvd.  
San Francisco Office,  
Rialto Bldg.

# CRANES





The way to better public relations  
Good Service depends

## A coil properly taped gives the best service

The Columbia Coil Taping Machine successfully combines tight and swift taping. A coil properly taped not only gives the best service but it needs less tape. And quick taping means lower labor costs and more time saved in the shop. What more can we say but that we use these machines on our own coils?



Winding Machine for Armature and Field Coils

**Columbia  
Coil  
Winders  
Make  
Operators  
Serve  
Better**

Columbia Coil Winders make up for the deficiency of their operators—or enable good men to do even better work in minimum time and at least expense. They speed up winding to the utmost. Characteristically COLUMBIAN in their all-'round quality. A Bulletin (on request) gives you detailed reasons why. Get your copy.



**Columbia Machine**  
Atlantic Avenue and Chestnut S

**Columbia**



**Through Good Service  
Upon Good Equipment**



**Trolley  
Wheels  
for  
Every  
Service**



Steel and Malleable Iron Gear Cases

We make sleet-cutting wheels that cut sleet without auxiliary sleet cutters. Columbia Trolley Wheels—standard and special—4-, 5- and 6-inch diameters—ready for immediate shipment.

## Gear Cases that Render Service

Sheet steel. Malleable iron. Prevent fracture at the suspension points and trouble from dust and mud. All our experience along these lines (and it is quite considerable) has gone to make these Gear Cases trustworthy.



Columbia Armature Banding Machine

**Works & Malleable Iron Co.**

Brooklyn, N. Y. W. R. Kerschner Co., Inc., N. Y.  
Holden & White, Inc., Chicago

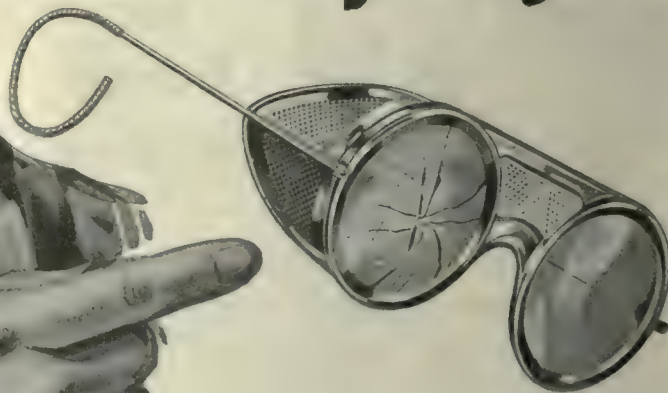
F. F. Bodler, San Francisco  
Railway & Power Eng. Corp., Ltd.,  
Toronto, Can.

**Equipment and  
Specialties**





# That **STOCO** **"CELOGLAS"** **SHATTER-PROOF LENS** saved my sight



Your men will appreciate the protective advantages of this new **Stoco** "Celoglas" lens. It's the best possible protective lens in the best possible protection goggle.

The new "Celoglas" lens will be supplied only in **Stoco** safety goggles.

It is composed of a sheet of thin celluloid cemented by an exclusive process between two clear glass lenses. It has practically the same

percentage of visibility as a lens made entirely of optical glass and a very much higher degree of eye protection.

"Celoglas" lenses may fracture through a severe blow from a flying missile, but they will not leave the frame and the glass will not fly into the eyes of the wearer. You can supply them to your employees with the assurance of perfect security.

**Stoco** safety goggles are supplied with either easy cable temples, as illustrated, or with elastic headbands, each pair in an individual carton. The price is the same with either cable temples or headbands.

Price with heavyweight optical glass lenses	\$90.00 per hundred pairs
Price with "Celoglas" shatter-proof lenses,	\$115.00 per hundred pairs

Sample with either "Celoglas" or regular lenses will be sent without charge to any safety engineer or superintendent upon request

## STANDARD OPTICAL CO., GENEVA, N. Y.



## Repair Shop Equipment That Will Save You Money

In repair work it's the time lost waiting for the job that ties up your equipment and eats into your profits.

When done outside in a jobbing shop this item of time lost is especially high.

That's one of the main reasons why more and more street railways are making their repairs in their own shops. Most of them, you'll find, are using Niles Bement Pond machine tools—equipment specially designed and built for speed and to reduce costs on railroad work.

Our Car Wheel Lathes, Axle Lathes, Car Wheel Borsers, Radial and Sensitive Drills, Planers, Sloters, etc., are particularly applicable for street railway shop work.

The Hydraulic Wheel Press which we illustrate here is another time and labor saver that has been very successful. We can supply special attachment for removing wheels without disturbing driving gears.

We build Steam Hammers and Electric Traveling Cranes also, and our Pratt and Whitney Small Tools complete the list.

*We'll gladly furnish details on all or any equipment you require. Our experts can give you information on repair shop installation and arrangement that is decidedly worth while. No charge nor obligation.*

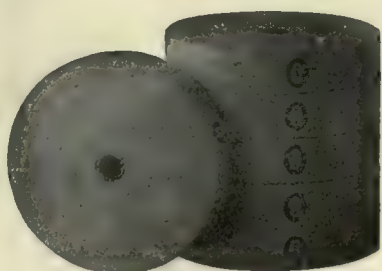


# NILES-BEMENT-POND CO.

GENERAL OFFICES, 111 BROADWAY, NEW YORK



# Tape of Quality



**T**APES and Web-  
bings made from the  
best raw materials—  
made with the most up-to-  
date machinery, and most  
reasonably priced—

That's what you get in  
Hope Products.

There is a Hope Tape or  
Webbing for practically  
every purpose in the rail-  
way field.

If you are at all particular  
about good results—dura-  
bility and invariable qual-  
ity—

Be sure to use Hope Brand,  
and satisfaction is assured.

*Send for Samples.*

**Hope Webbing Co.**

Providence, R. I.

396 Broadway, New York





# SPRACO

## PNEUMATIC PAINTING EQUIPMENT ON THE B.R.T.

You will find economy and speed in the painting of the 39th St. Shops, Brooklyn. The B.R.T. use the "SPRACO" Pneumatic Painting Equipment.

"SPRACO" enables one ordinary workman to paint as much as five high-priced painters. This cuts labor costs.

It covers evenly remote nook and corner. This means a better job. The air-tight container allows no evaporation. This insures quality.

Dripping as with the old-style brush method is eliminated. This saves paint.

Inaccessible surfaces may be reached without scaffolding or staging. This saves time and expense.

Use "SPRACO" for painting your outside steelwork as well as on interior jobs. Full details on request.

Write for the "SPRACO" booklet



### Spray Engineering Company

97 Federal Street, Boston, Mass., U. S. A.

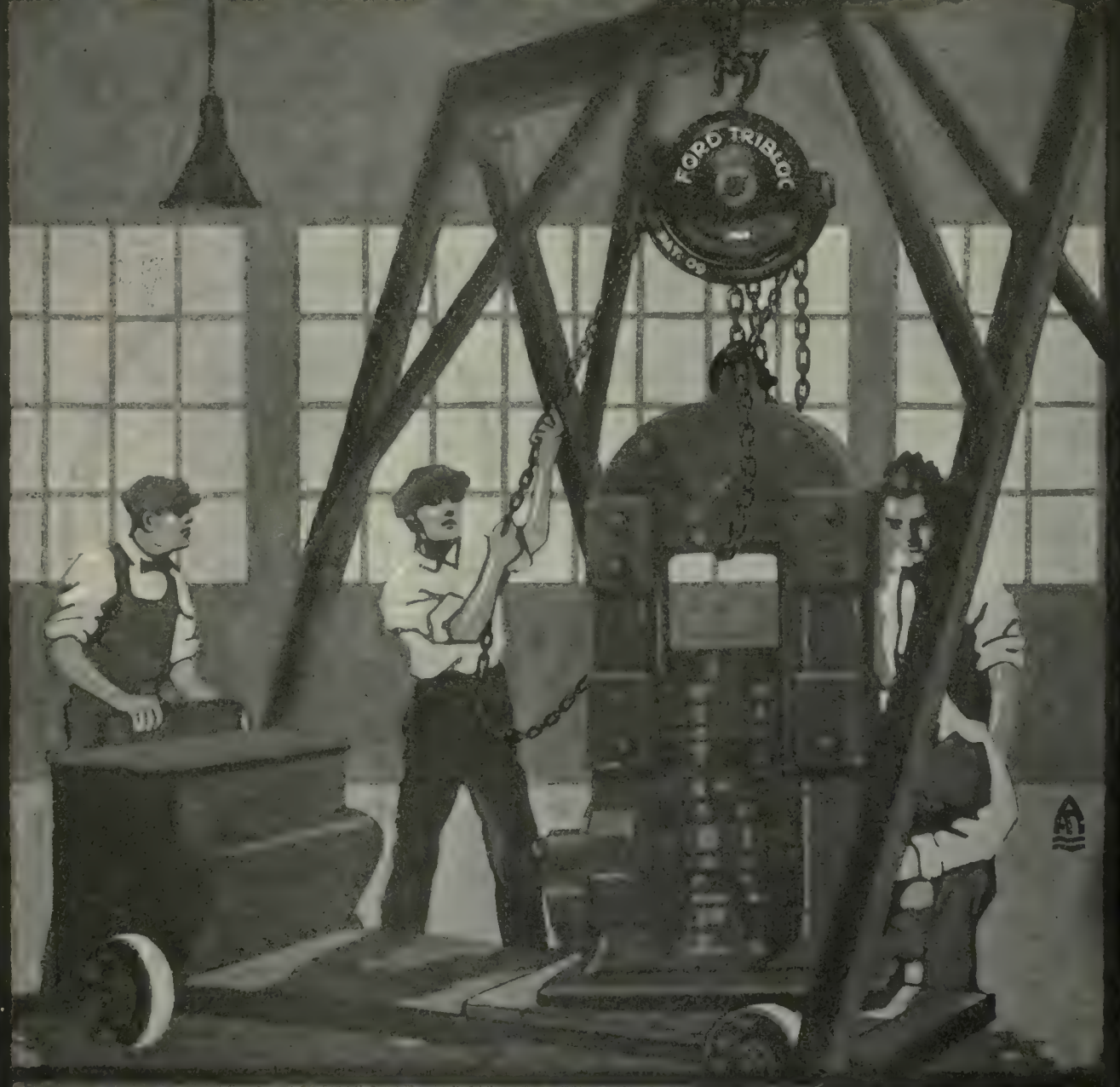
Code Address—SPRACO, BOSTON

Code—WESTERN UNION





# FORD TRIBLOC



## For Handling Heavy Machinery

A hand chain hoist is unapproached for handling heavy machinery or piling heavy stock in close quarters or short headroom.

And there need be no hesitation in handling the heaviest parts if the hoist selected is a Ford

Tribloc. For the Ford Tribloc will hoist or hold safely  $3\frac{1}{2}$  times its generously rated load as a result of steel working parts and its Loop Hand Chain Guide that prevents damage to the block due to "gagging."

Write for Catalog 3, giving the details of construction and our five-year guarantee

**Ford Chain Block & Manufacturing Company**  
Second and Diamond Streets, Philadelphia, Pa.



# For Low Maintenance Cost

Standardization Is More  
Than Ever a Timely Topic

IN LOOKING forward to the 1919 convention of the Engineering Association one tries to visualize what he would like to see in the program. Involuntarily his mind turns to standardization, now more timely than ever because everything costs so much more than it did before the war.

## Standardize on

PERFECT  
**MICANITE**  
INSULATOR

REG. U. S. PAT. OFF.

## PRODUCTS

### Micanite

Commutator Insulators, Tubes, Washers, Rings, Segments, Sheets, Tapes, etc., made of imported mica.

### Empire

Linseed oil treated Cambric, Linen, Silk, Canvas, Duck, Papers and Tubing. High puncture voltage, long life.

### Kablak

Black Varnished Cambric, Linen, Silk, Canvas, Duck and Papers. Flexible, efficient under high temperature.

### Linotape

Linseed oil coated tape, both straight and bias cut for coil winding, cable splicing, bus bars, etc.

### Mico

Untreated insulating fabrics, Papers, Fibres, Linen Tapes, Sleeving, Shellacs, Cements and Varnishes.

*Send for bulletins covering all these products and cut your maintenance costs.*

## Mica Insulator Company

Manufacturers

68 Church Street, New York

542 So. Dearborn Street, Chicago

Works: Schenectady, N. Y.





## Ready for Both Line and Shop

Duff Genuine Barrett Jacks are standard for emergency service wherever cars are equipped with jacks for that purpose.

### As Car Jacks

they prevent many minor accidents from becoming fatal, and prove wonderfully helpful in clearing the track of stalled vehicles.

### As Shop Jacks

they are applicable to a great variety of lifting purposes, particularly at terminal inspection points, where only one shopman is available.

The No. 239 Jack, shown above, is a popular type with electric railways, who decided in favor of a *jack on every car*. Constructed with a drop forged swiveling claw, with a sideways swing of 120° it is easily operated in close quarters, and clearance can always be obtained for the operating lever. It is used either vertically, or inclined up to a 15° angle, and lifts its full rated capacity on either head or claw. When used inclined with claw swinging out from frame, a derailed car is quickly moved horizontally back on the track.

An interesting bulletin has just been printed, describing Duff Car Jacks and other Duff Jacks used by electric railways. Send for a copy to-day.

**THE DUFF MANUFACTURING COMPANY** Established 1883

New York

Chicago

Atlanta

St. Paul

**Pittsburgh, Pa.**

San Francisco

**DUFF** GENUINE  
BARRETT **JACKS**



# DURADUCT

*Is Ideal for Lightning Arrester Circuits  
Because It Is Non-Metallic*



**I**NDUCED high-voltage potential from a lightning-laden atmosphere can play hob with metallic conduit. This fact was brought out in a recent Electric Railway Journal article by Q. A. Brackett, Westinghouse Electric & Manufacturing Company who writes:

“When the arresters are mounted underneath the car the leads to and from them should be as straight as possible and should not be enclosed in metal conduit.”

We recommend that when you go over your cars to strengthen them against summer storms, you run all lightning protection circuits in

# DURADUCT

(Reg. U. S. Patent Office)

A flexible non-metallic conduit available for  
any circuit on your car from roof to rail.

**TUBULAR WOVEN FABRIC COMPANY**  
MANUFACTURERS • PAWTUCKET • R. I.

**A. HALL BERRY • GENERAL SALES AGENT**  
71-73 Murray Street, New York      9 So. Clinton Street, Chicago

**WENDELL & MACDUFFIE CO.** 61 Broadway, New York City

Distributors for all foreign countries except Canada

**Northern Electric Company, Distributors for Canada**  
LIMITED





When Headlights  
go out it means  
Danger—Delay—  
Dissatisfied Patrons

# **“DELTABESTON”**

## **MAGNET WIRE**

### **Keeps Headlights Burning**

“Deltabeston” Magnet Wire withstands excessive heat and moisture. Arc headlight magnets wound with it do not burn out. We can give you proofs of this statement from the many roads now using “Deltabeston” Magnet Wire, where their arc lights continuously light the line under

all conditions. “Deltabeston” Magnet Wire will also save your field coils from burning out.

We have other styles of “Deltabeston” Wires—all-asbestos insulated—as well as “Deltatape” and “Delta Sheeting.” The famous “D & W” fuses are also made by us. Let us tell you more about these materials.



**D & W Fuse Company**  
**Providence R.I.**

**U. S. A.**





# What would it mean to YOU?

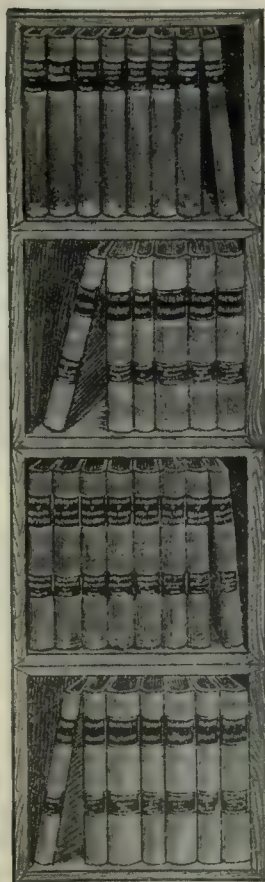
Wouldn't it pay you to put some of your spare time each day into specialized training?

It is paying others—big. A man is never too old to learn, and he never earns as much as he should.

Don't go to school again, but don't stop studying. A few minutes spent each day with a standard book can mean only one thing—more knowledge, and knowledge is certainly paid for today as never before.

## Over 60,000 men are succeeding through McGraw-Hill Home Study Courses

With the ending of the war, industrial America is teeming and throbbing with the greatest activity in its history. There are not nearly enough trained men to go around. Thousands of men in the less profitable fields of endeavor are preparing themselves, through the medium of standard technical books, for the better positions, and there is a place waiting for every man who is fit. Over 60,000 progressive men in this country are finding the McGraw-Hill Home Study Courses a sure means of attaining real success.



### Power Plant Library

Power plant practice complete, including mathematics, boilers, engines, electricity, turbines and refrigeration. Now the most used engineers' library in existence. Has enabled thousands of men to pass the most rigid examinations. 2,500 pages, 1,500 illustrations. Eight handsome volumes, bound in the tough T pattern of cloth, as durable as leather. Price \$12, payable \$1.00 per month.

### Factory Management

A set of books written by leading authorities, to help men fit themselves to take complete charge of the shop or factory. Covers industrial organization, administration, purchasing, manufacturing costs and accounts, engineering of shops, factories and power plants. 6 volumes, 2,300 pages, fully illustrated. Bound in semi-flexible karatol. Price \$20, payable \$2 in ten days and \$3 per month.

### Croft Library of Practical Electricity

Without question of more practical value than anything of the kind ever attempted in the world of electricity. Enables you to know electricity as experts know it. Mathematics, practical electricity, electrical machinery, central stations, wiring for light and power, wiring of finished buildings, illumination. 8 flexible volumes, pocket size, 3,000 pages. Price \$16, payable \$2 per month.

### Iron and Steel Library

The high positions in the great iron and steel world are now attainable through this library, which is written by authorities actually engaged in this work. Metallurgy, foundry work, blast furnaces construction, operation and products, refractories. A complete iron and steel library. Seven volumes, over 3,000 pages. Fully illustrated. Price complete \$24, payable \$3 per month.

### Machine Shop Library

Machine shop practice complete. Written by eight practical men, well known in the machine shop world. Now the standard in America. No other set of books on the subject ever equalled it in popularity. Mathematics, drawing and design, composition and heat treatment of steel, gears, tool work, grinding, jigs and fixtures, screw machines, dies, etc. 9 volumes, 3,000 pages. Price \$16, payable \$2 per month.

### Metal Mining Library

Herein is brought together in nine flexibly-bound volumes the very meat of metal mining practice in America. Examinations, principles of mining, timbering, thousands of working details, ore-dressing, surveying, accounting, costs. All the information you need to reach the high positions in the mining world. The most complete provisions saved by plain words and illustrations. Price \$24, payable \$3 per month.

### Coal Mining Library

Coal mining and colliery practice complete, including outside and inside work—both mechanics and engineering. Of assistance to every man in the business, from the lowest head man to the operator. It is now looked upon as a necessity, and as containing the secrets of success in coal mining. 8 volumes, 3,000 pages, 1,700 illustrations. Price \$16, payable \$2 per month.

### Radcliffe's Electricity

A three-volume compact set of books on the practical side of electricity. In question-and-answer form for quick reference. This course is somewhat condensed, and will be found of special value to those interested in electricity as used in power plants. 700 pages of facts, illustrated and carefully indexed. Price \$6, payable \$1 per month.

**"See them first—pay afterwards"**



## Any Library Shipped on Ten Days' Trial—At Our Expense. Merely Return the Coupon

Look at the illustrations of the libraries at the left and right of this page. Then refer to the coupon, check the library you want, fill out the blank spaces carefully and return to us. After receiving the books, go over them carefully. Keep them ten full days. See how much knowledge you can gain from them within ten days. If then you decide you cannot afford to be without them, send us the small monthly payments called for. If on the other hand you do not want them, return at our expense. But pay no charges. We bear shipping expenses both ways.

Pay only  
\$1 to \$3  
per  
month  
if you  
are  
satisfied

## Free Examination Coupon

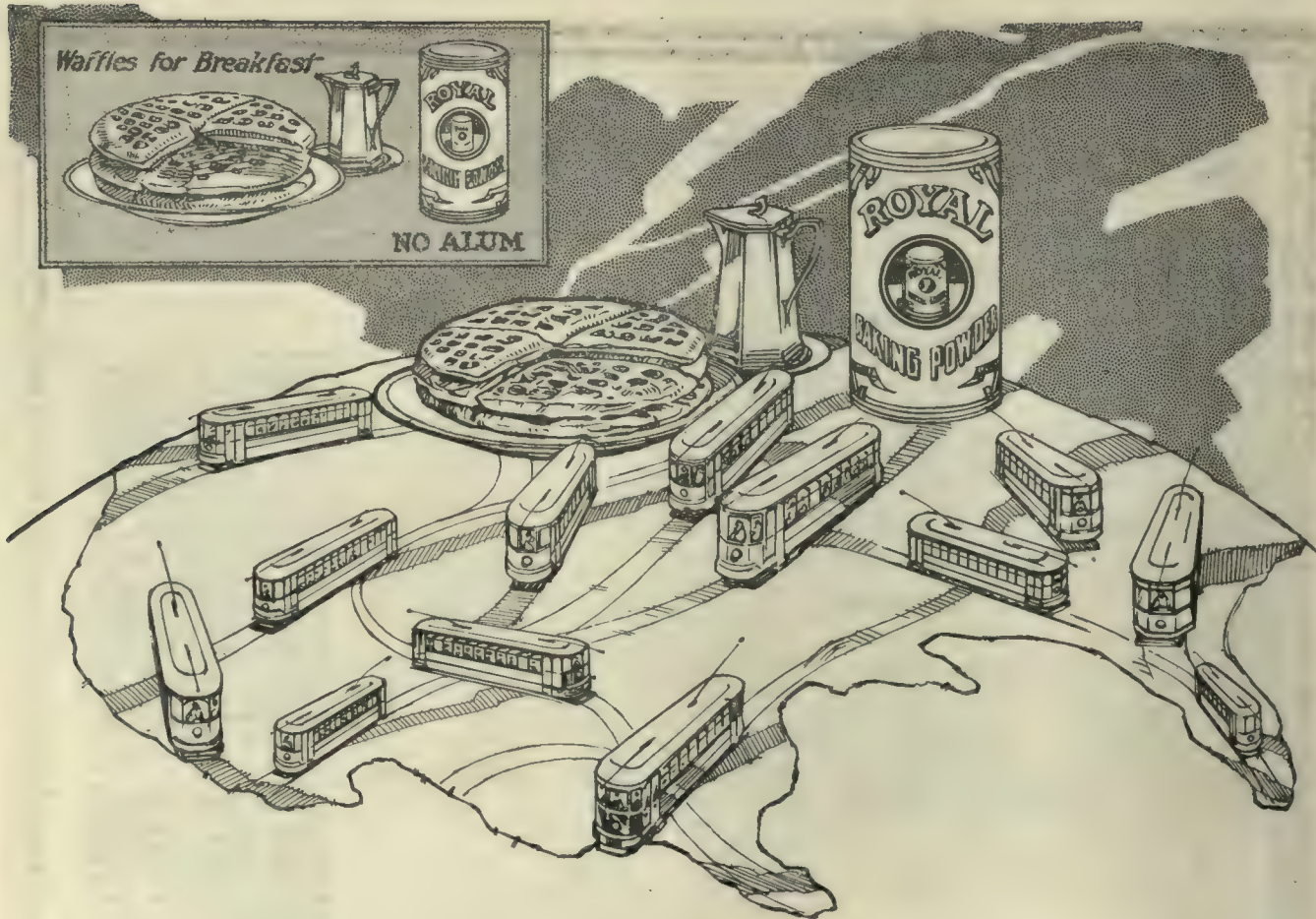
McGraw-Hill Book Co., Inc., 239 W. 39th St., N. Y. Gentlemen: Send for ten days' free inspection the Library I have checked below:

- ☐ Croft's Electricity, \$16—payable \$2 per month.
- ☐ Machine Shop Library, \$16—payable \$2 per month.
- ☐ Iron and Steel Library, \$24—payable \$3 per month.
- ☐ Mining Library, \$24—payable \$3 per month.
- ☐ Coal Mining Library, \$16—payable \$2 per month.
- ☐ Power Plant Library, \$12—payable \$1 per month.
- ☐ Factory Management, \$20—payable \$3 per month.
- ☐ Radcliffe's Electricity, \$6—payable \$1 per month.

If satisfactory I will send first payment in ten days and the same amount each month until paid. If not wanted I will return the books at your expense.

Signature .....  
Residence address .....  
City and State .....  
Your employer .....  
His address .....  
Your occupation ..... E3-22-19





## WAFFLES!

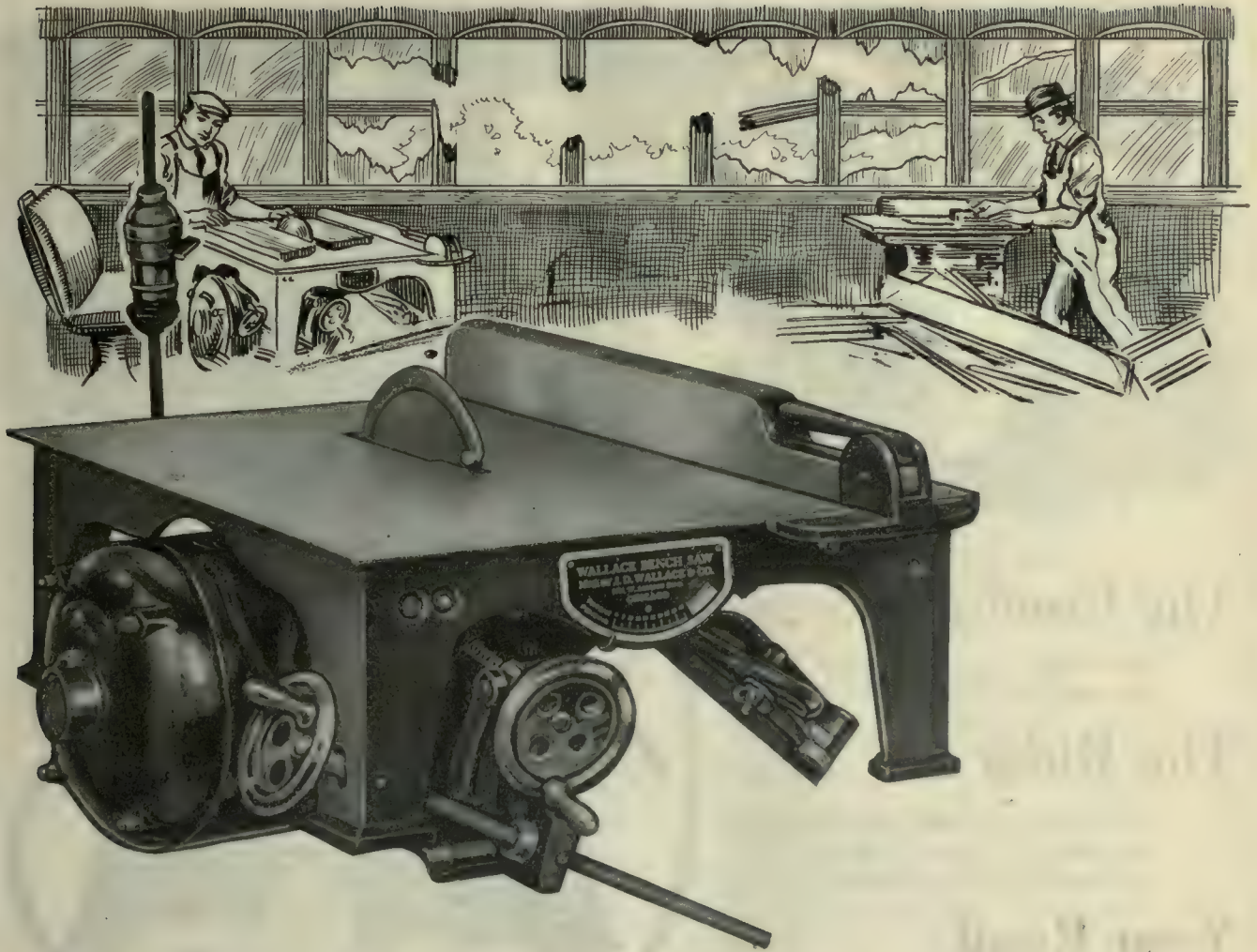
### From Maine to California

This country has many Business Establishments maintaining a nationwide distribution of products. These Establishments are too big for the advertising contractor of limited scope to handle. Collier Service, because it is nationwide, is able to direct the advertising of such nationally used staples in the cars. The Collier organization, by intelligent, adequate service to these advertisers, assures the railway companies a stabilized income from their car card space.

*Barron G. Collier*  
INCORPORATED

Candler Building  
220 West 42nd Street, New York City





# The Wallace Bench Saw

*Portable—Goes Anywhere—Cuts Cost*

The Wallace Bench Saw is portable. It can be rushed to the damaged car and set inside if necessary. Or, it can be taken anywhere in the shops—works right 'long side of the workman and saves him wasting so much time walking to and from a stationary saw and doing so much work with the hand saw.

## *Cutting Angles*

Another feature which enhances its value in the car shops, pattern and cabinet shops is the method for cutting angles. The saw tilts instead of the table. The work doesn't

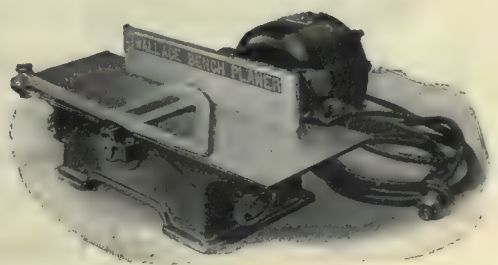
come in contact with the floor or other obstacles. The men are always working on a table that is horizontal—an efficient and safe position.

## *Power*

The Wallace Bench Saw operates off of the regular electric lighting circuit, yet it has ample power to cut a full 2-in. through the hardest of woods.

*The Wallace Bench Planer is another portable electrically operated tool that will do wonders in cutting your shop costs.*

Write today for details on these Wallace Labor Savers. A post card will bring this information.



# J. D. Wallace & Company

Loomis and Jackson, Chicago, Ill.





## The Conductor

Saves time—avoids disputes with you or the passengers—records every cash fare.

## The Rider

Gets a receipt showing the full amount paid and has a feeling of absolutely fair and square dealing and protection.

## Your Road

Gets a record of every cash fare—gets better service from your Conductor by saving his time—and increases the good will of the riding public—all with the

# Macdonald Ticket and Ticket Box System

This system offers a threefold advantage, as explained and illustrated above. Many roads are using it—and the first complaint has still to be received by us. It meets the double need of making the most of your present *revenue* and rendering such service as will swing over the public to your favor in the fight for the just increase in fares. Its operation is as simple as tearing a piece of paper. Let us show you—we will demonstrate conclusively that your conditions and receipts will be bettered by this simple system.

The Macdonald Ticket & Ticket Box Co., Cleveland, Ohio





Type R-5. Double Register

# International Fare Registers

have for nearly a quarter of a century been and are today the standard equipment of a majority of the Electric Railways and City Systems of this country.

Cars equipped with Money Counting Fare Boxes need this visible and audible registration of the Fare Register as an additional check against the Fare Box. Where Non-Registering Fare Boxes are used a Fare Register affords the only method of checking against the Fare Box. Only by their use can the registration of paper tickets and transfers be made.

The test of long service has shown the International to be not only accurate and reliable in their registration but so rugged in construction as to give enduring service. All parts are interchangeable, repairs few and easily made.

Exclusive Selling Agents for  
HEEREN ENAMEL BADGES

## The International Register Company

15 South Throop Street  
Chicago



Type R-10. Single Register



Vol. 7, No. 6

A E R A

620

TRANSPORTATION

T-306 What is the correct method of collecting and registering fares on a line that has two five-cent zones, with an eight-cent fare for passengers traveling from one zone to the other?

T-307 In engaging discharged soldiers and sailors as trainmen consider it

# The New Rooke Models Supply The Answer To This And Similar Operating Problems

## One Method—One Mechanism

It has been strictly up to the fare register manufacturer to mechanically harness, through the use of new inventions, a fare register apparatus to meet the great changes which have come about in fare collecting and auditing. Of what use to you is the *privilege* of charging a 7c. or 8c. fare, if you cannot safely collect it? With one fare unit in your city operation, another unit in your zone service and with different types of cars forcing you, seemingly, to use different combinations of boxes, clock registers, cash receipt schemes, etc., the trolley executive has been strictly up against it.

What you need right now is ONE METHOD of fare collection, served by ONE MECHANISM. You want to *standardize*. You cannot get results by adding one or more registers to the two you already have in the front end of your car. You want the same quality of *passenger co-operation and auditing certainty* on your box cars, open cars or zone collecting cars that you anticipate enjoying through your prepayment operation. You do not wish efficiency in *spots*.

You recognize, also, that *conductor-operated, optionally-used*, old or new types of cord or rod-operated registers, receipt slips, etc., *will not get you the money*. They cannot be rigged to be efficient. They are built around a *wrong conception* of the sort of passenger co-operation needful in order to safeguard your receipts.

The ROOKE method of collection has *always been right*. The idea of the passenger registering *his own fare*, no matter when that fare was paid or on what type of car collected, has *always been right*. It has worked out and delivered the all-important financial benefit desired. Ask any company using ROOKE registers. There has been a big basis for improvement, however, in the *capacity* of the ROOKE register to receive different sorts of cash and ticket fare combinations.

This advertisement brings to you the first news of our accomplishment along this line. We announce the *invention, thorough testing and early readiness-for-the-market* of FOUR NEW TYPES OF ROOKE REGISTERS.

Simply telling you how the registers operate will go far to show how they could fit in to meet your operating conditions. NOW you should have no excuses. We can probably handle *all* your business. The ROOKE is no longer a one-coin proposition.

—(1)—THE 2-COIN ROOKE FOR NICKELS and DIMES: The insertion of a nickel instantly moves up one point on the totalizing counter; the dime charges the conductor with two such points. The conductor's turn-in is figured at the rate of five-cents-a-point, for each numerical point accumulated on the *one totalizing counter*.

—(2)—THE 3-COIN ROOKE FOR NICKELS, DIMES and QUARTERS: With this register, the insertion of a nickel moves one point; the dime, two points and the quarter, five points, on the *one totalizing counter*. The conductor's turn-in is on the basis of five cents a point for each such accumulated point.

—(3)—THE 3-COIN ROOKE FOR NICKELS, DIMES and METAL TICKETS: This metal ticket can either represent a 6c., 7c., 8c. or 9c. fare unit. This is a *penny-a-point* register. The insertion of a

nickel moves up five points; the dime, ten points and the metal ticket moves the totalizer either six, seven,





eight or nine points, depending on the arbitrary fare rate represented by the metal ticket coin—all on *one totalizing counter*.

Should this metal ticket represent a six-cent fare and later represent a seven-cent fare, the register can be adjusted so that the counter would move forward the proper number of points to correctly represent the advance from the old to the new fare rate. The conductor's turn-in would be figured on the *penny-a-point basis*. This register could also be used where no metal ticket is used and a six-cent fare collected in the form of a nickel and penny.

—(4)—THE 4-COIN ROOKE TO RECEIVE NICKELS, DIMES, QUARTERS and A 2½c. TICKET:

This four-coin register would charge the conductor at the rate of 2½ cents for each point accumulated on the *one totalizing counter*. The insertion of the 2½c. metal ticket would operate one point on the totalizing counter; the insertion of a nickel, two points; the dime, four points and the quarter, ten points.

Should it be desirable to have the metal ticket represent a 7½c fare or a 15c. fare, the insertion of this coin would move the totalizing counter the proper number of points to represent either of these values.

WHY THE 2½c. TICKET? Well, one large road already plans for a ticket of this value, in order to get the *heavy short-rider traffic*. These tickets will be sold at the rate of two for five cents and used to win the short riders and to please the rider in the matter of a reasonable charge for short lap-over privileges in zone collections.

This metal ticket would, of course, be manufactured in a *diameter determined by us*.

These new ROOKE registers differ but little in appearance, size or weight (21 ounces) from our old models. All different coins are paid into the *one coin slot* and registration is *positively automatic and instantaneous*. Auditing accuracy is determined while the inserted and gripped coin still remains in passenger's fingers. These registers are *unbeatable*.

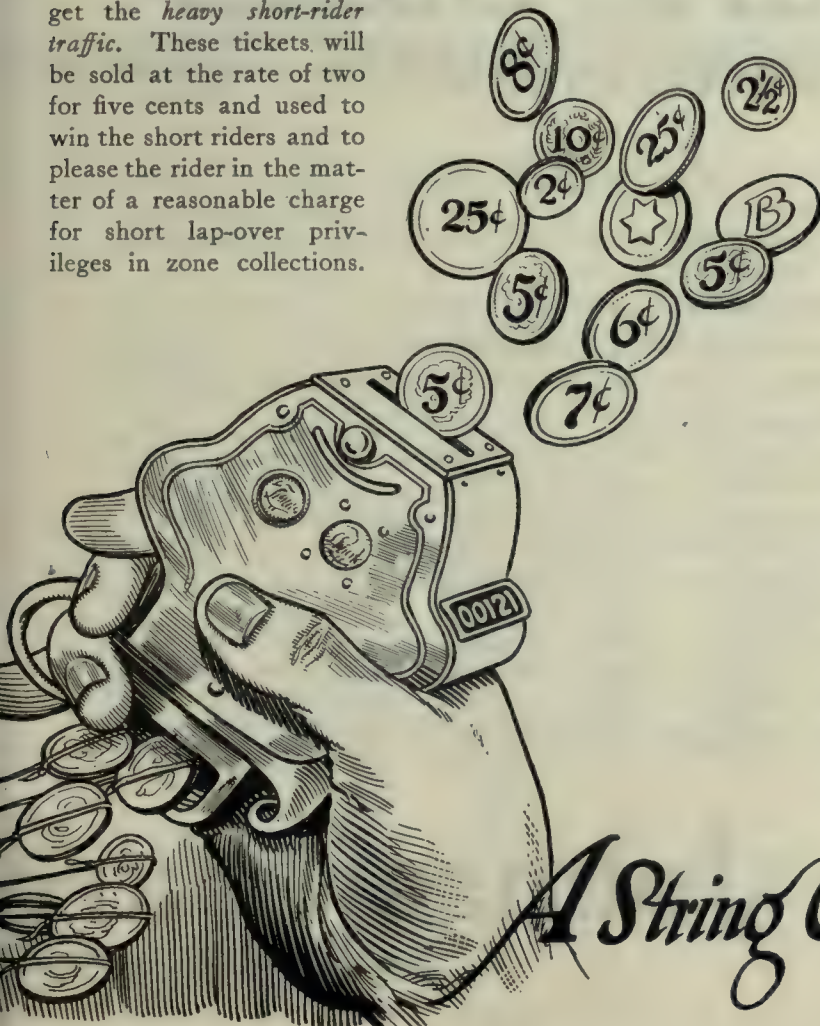
**RECENT INSTALLATIONS:** We refer to recent important installations of ROOKE registers by The Shore Line Electric Railway Company and The Bay State Street Railway Company.

The ROOKE register may be *installed without friction* or embarrassment and without involving expenditures to re-arrange your cars to receive the system. It brings to you the best possible **METHOD** of collection, with great auditing economies and maintenance savings. The **MECHANISM** enables you to successfully *standardize fare collection on all your equipment*.

ROOKES are portable, of course. The register *must be portable* to get the results you want. The system must be as mobile as your conductor's work requires him to be. The ROOKE is *man equipment*, not *car equipment*. The ROOKE is *simply a small farebox*. It is *brought to the passenger conveniently*, when the passenger does not conveniently *come to it* on the prepayment platform. It absolutely defeats the old "bunching" and "substituting" evils. It protects the conductor—casts no reflections—imposes no hardships and G-E-T-S T-H-E M-O-N-E-Y.

**Rooke  
Automatic  
Register Co.**

**Providence, R. I.**

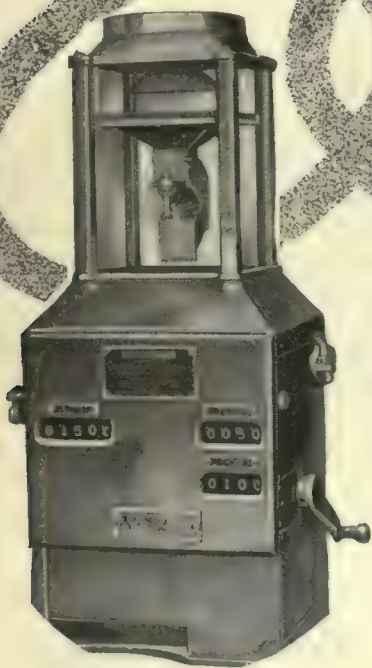


*A String On Every Fare Value*



# The most important factor in cash fares is a **Better System**

Stop a moment. Have you ever looked upon fare collection as something **more** than a means of collecting revenue for **yourself**? Have you ever considered the fact that a better system of fare collection can be made one of the most potent sources of **better service** and one of the most effective creators of **public good will**? Certainly both of the foregoing are factors of the utmost importance to the railways today—and



## Johnson Fare Boxes

More than 15,000 in use

put into your hands a means of cultivating them to the *n*th degree.

**From the passenger's viewpoint** (whether they know the reason or not), Johnson Fare Boxes,

Make **boarding** the car simpler and quicker—

Avoid confusion and delays in **alighting**—

By speeding up loading and unloading, insure quicker car service—

The passenger "gets there" in fewer minutes—

The conductor has more time free to see to the passengers' convenience, comfort and safety—

The passenger, depositing his own fare, the most potent source of argument and friction is wiped out—

Passengers who **do** pay are protected against the man who would like to ride free.

And these are only the "high spots"—a mere outline of the way Johnson Fare Boxes make the trip smoother, pleasanter, speedier, **WORTH MORE MONEY** to your patrons—and to get that increase is now your vital problem. Johnsons secure and record every cash fare **NOW**—and will make the cash fares grow in the future.

# Johnson Fare

Jackson Boulevard and

50 East 42nd



# in the fight for increased of Fare Collection

In these days of flux and change in the rate situation, in addition to FARE BOXES that will get all the fares and make riding more attractive and worth more to your patrons, it is of prime importance to adopt a flexible system of fare collection in regard to the token of value as well.

## Johnson Metal Tickets Simplify Fare Rate Changes

The metal token is the most satisfactory fare unit ever devised. Its value as a fare, which is determined by the issuing company, may be changed without impairing its efficiency. It represents a full fare whatever the rate may be.

Used in connection with the Johnson Coin Registering Fare Box and double checked by the overhead register Johnson Metal Tickets have simplified fare collection and at the same time eliminated the tremendous waste and useless cost of paper tickets.

And Johnson Metal Tickets **please** the public and assist in fostering the good-will that the Fare Boxes create. One of the most inconvenient factors in increased fares is the payment of several coppers and the confusion and endlessness and delays of change-making. This is all smoothed out at once by Johnson Metal Tickets, for passengers can buy a **stock in advance**, exactly like a "string" of paper tickets—and pay in as rapidly as with the old rates of fare—and without having the rate increase emphasized. The color and stamping of the tickets can be suited to the most varied requirements, covering all fully and completely.

*To get all the fares now—and to get more fare in the future—Johnson Fare Boxes and Johnson Metal Tickets.*

# Box Company

Robey Street, Chicago  
Street, New York





# HALE AND

## World-Wide Reputation

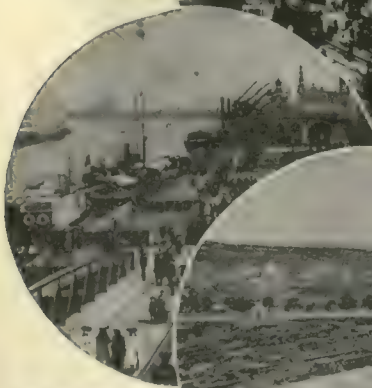
# SEAT



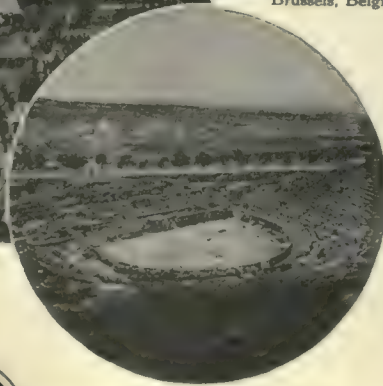
Nantes, France



Brussels, Belgium



Antwerp, Belgium



Athens, Greece



American electric railway operators know that Hale & Kilburn seats are the best in America!

But we know, judging from foreign purchases and re-purchases of Hale & Kilburn seats, that they are the best in the world!

Whether you travel to England, France, Spain, Belgium, Italy, Russia, Greece, Turkey — almost anywhere — you will find Hale & Kilburn seating synonymous with the best street, tram, interurban or heavy railway service. For example, the

Underground Electric Railways of London have more than 30,000 Hale & Kilburn seats.

Belgian city and suburban lines, including Brussels and Antwerp, have thousands upon thousands of Hale & Kilburn seats.

Nantes, France, has more than 1000 Hale & Kilburn seats.

Athens has about 1500, Madrid about



No. 300A

# Hale & Kilburn

Philadelphia  
Washington

New York  
Atlanta

LONDON—G. D. PETERS CO., LT



# KILBURN

## World-Wide Installation

# ING

500, Naples more than 1000, Odessa about 5000 and even Constantinople has about 2000 type 199-A, Hale & Kilburn seats.

It goes without saying that the conditions which Hale & Kilburn seats are fulfilling in these services cover the widest possible ranges of speed, accelerations, etc. In the case of some countries, as Russia, for instance, the design of the seat is also influenced by differences in clothing!

With such world-wide experience at our command, we may rightly assert that there is no seating problem from heaviest electrification to **LIGHTEST ONE-MAN SAFETY CAR** that we cannot solve to your satisfaction.

The 300-A and other recent H. & K. seats illustrated prove that we are determined to maintain the reputation for Hale & Kilburn leadership.



No. 108AV



Madrid, Spain



Naples, Italy



Odessa, Russia



Constantinople, Turkey



COPYRIGHTED

## Corporation

Chicago St. Louis Detroit  
San Francisco Dallas Louisville  
5 DEANS YARD, WESTMINSTER





A No. 39 Type Ohmer Fare Register

# Ohmer Fare REGISTERS

OHMER Fare Registers are made in many different types to meet the many different requirements of the electric railways. Every Ohmer Fare Register, however, whether it is one of the small city type machines with a capacity of but three or four fares, or

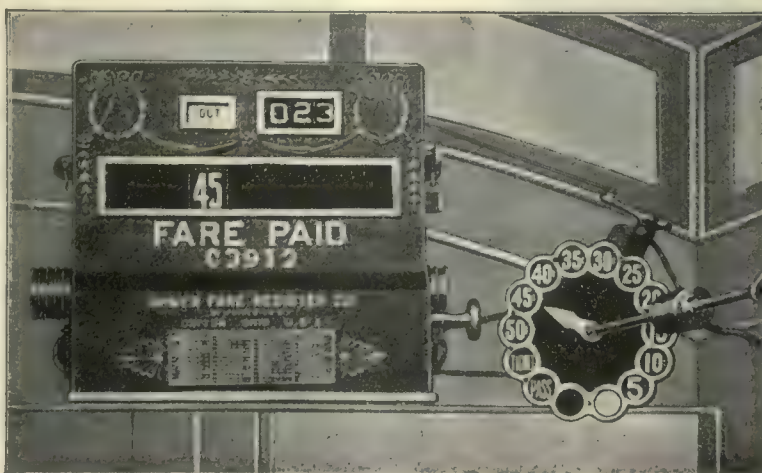
one of the large interurban types registering over a hundred fare denominations, *is built on the same principle. Each fare is clearly indicated as it is registered. A permanent untamperable record of each fare is printed, together with all other necessary data.*

We illustrate a No. 39 City Type Ohmer Fare Register together with its printed record. We also show a No. 52 Interurban Type, adapted to ordinary interurban service.

Let us explain some of our other types to you. Our experience has shown that we can meet every requirement with some one of the many types of Ohmer Fare

TIME	DIRECTION	LINE NO.	TWO PASSES	TICKETS	PASSES	5¢ FARES	TOTAL CASH	REGISTER NUMBER	TOTAL PASSENGERS	DATE	IDENTIFICATION
4 23P	L	18	0 0 0	0 0 0	0 0 0	0 0 0	\$ 00.00	3	7470	5	INS8
4 23P	L	18	0 42	0 47	0 56	1 98	\$ 09.90	3	7470	5	27
3 34P	O	18	0 35	0 32	0 36	1 63	\$ 08.15	3	7393	5	27
2 25P	L	18	0 24	0 17	0 21	1 06	\$ 05.30	3	7295	5	27
1 36P	O	18	0 07	0 09	0 08	0 50	\$ 02.50	3	7201	5	27
12 27P	L	39	0 0 0	0 0 0	0 0 0	0 0 0	\$ 00.00	3	7127	5	27
12 27P	L	39	0 72	0 74	0 68	2 47	\$ 12.35	3	7127	5	14
11 27A	O	39	0 59	0 55	0 43	1 89	\$ 09.45	3	7012	5	14
10 38A	L	39	0 34	0 34	0 16	1 38	\$ 06.90	3	6888	5	14
9 29A	O	39	0 16	0 15	0 03	0 63	\$ 03.15	3	6763	5	14
8 30A	L	39	0 0 0	0 0 0	0 0 0	0 0 0	\$ 00.00	3	6666	5	14

Report from a No. 39 Type Ohmer Fare Register

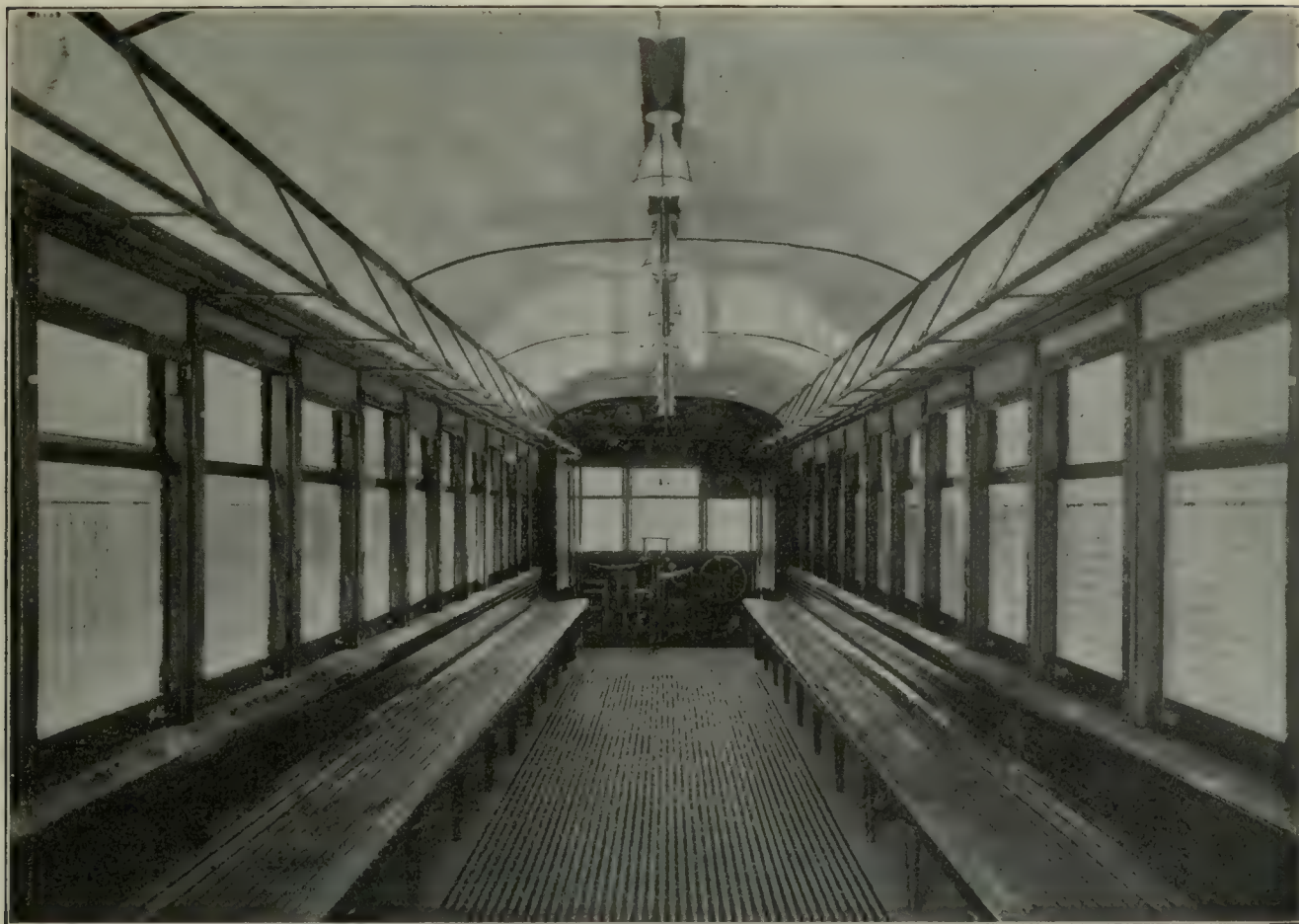


A No. 52 Type Ohmer Interurban Type Register

Registers. We will be glad to advise with you about your fare collecting problems. The services of our experts are at your command without obligation to you.

**Ohmer Fare  
Register Company**  
Dayton, Ohio, U. S. A.





The Philadelphia Traction Company's  
100 New Cars are Equipped with  
**Nevasplit Headlinings**

NEVASPLIT is used on the 100 cars ordered through the Emergency Fleet Corporation for operation by the Philadelphia Rapid Transit Co. to the Hog Island Shipyards.

It pays to start right when buying new cars. Replacements are expensive.

Nevasplit Headlining reduces maintenance costs to the lowest degree. Once put up, it stays up without warping or splitting. It is waterproof, reduces the weight of the car and adds safety and beauty to the car interior.

*Write for booklet and samples of Nevasplit.*

**The Keyes Products Company**  
120 Broadway, New York

**W.R. Kerschner Co., Inc.**

50 Church Street, New York

SAN FRANCISCO, Ford & Geirrine, Merchants Exchange Bldg.





## The Construction of Pre-payment Terminal is a Paying Investment

**T**HERE is no guesswork about the operation of the Perey Turnstile. Its work is absolute. It registers *all* the fares. When you have it installed, at terminals, in prepayment areas, ferries, subway and elevated stations, the operator settles with the company according to the register in the turnstile. There is no ground for anxiety, suspicion or mistakes on either side. All the passengers that ride have paid.

You can handle terminal crowds more easily, and three times faster with the Perey Turnstile than by any other method or device. "The machine is faster than the cashier."

### Prepayment Area in San Francisco Six-Track Loop Constructed to Handle Peak Load Gives Quick Service to Shipyard Workers

**T**HE Union Iron Works in San Francisco now releases about 18,000 employees at 4.40 p.m. each working day and about 85 per cent of them take the cars of the United Railroads which serve this locality. To expedite handling this sudden peak load the traction company has built a six-track loop in a prepayment area 100 ft. x 273 ft., the entrance to which is through turnstiles.

The twenty Perey turnstiles occupy a length of about 200 ft. along the east fence of the inclosure. No booth for making change has been installed. Collectors at the turnstiles make change when necessary, but it has been observed that the men have learned how to get through quickly and are usually prepared with the exact fare. At least there is no waiting in the lines, and by actual count a total of between 8000 and 9000 men have passed through the twenty gates and boarded the cars in twenty-three minutes.

*It saves money by eliminating breakage and rough handling of equipment. It saves labor. Women operators can be employed. We are prepared to make a study of your operating conditions and fare collection problems. Let us hear from you.*

**PEREY MANUFACTURING COMPANY, Inc.**  
30 Church Street, New York City





**Does Your Road Need More Revenue?  
Here's an Effective Means of Acquiring It.**

Money saved is money earned. Chicago Surface Lines are saving fully \$100,000 annually by use of our device. One hundred and thirty-nine other roads are saving all the way from \$1,000 to \$50,000 each year. Your road can save too. A road not equipped with this remarkable energy-saving and coal-saving device simply can't afford to be without it. Install it now—pay for it later, out of its earnings.

In considering the installation of equipment of this kind, it will be well to keep in mind that we also guarantee a sensitiveness to within one degree heat regulation, that is to say we guarantee that our regulator will maintain a constant temperature in your cars without a fluctuation of more than one degree either above or below a set point.

This is a vitally important improvement—in fact, it overshadows every other single improvement in the field of thermostatic heat regulation in years.

Another advantage of the UTILITY Heater Regulator is the spring mounting of the thermometer which renders it impervious to shock and makes it long lasting under all conditions of service.

A securely sealed case renders it tamper-proof, which is another desirable feature.

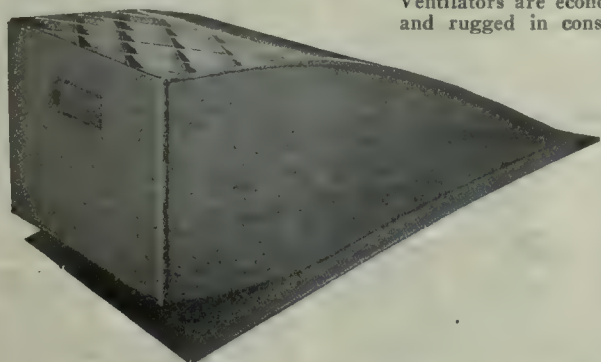
We shall be pleased to send any road interested full details of the entire proposition without its involving any obligation on their part to purchase the equipment.

**UTILITY Ventilators Are High in Efficiency  
and Economical in First Cost and Maintenance**

These ventilators are made in different types, to meet widely varying conditions. Through constant study of the field our engineers can tell you the type best suited to meet your particular ventilating conditions. Put your problem up to us. Utility Ventilators are economical in first cost, simple and rugged in construction, light in weight,

easily and cheaply applied, durable, water-proof, weather-proof, dust, dirt and cinder-proof. They exhaust the air efficiently whether the car is running or standing still.

Charts and full technical data sent to any road interested, on request.



Honeycomb Type  
for Arch Roof



Honeycomb Type  
for Side Deck

**Railway Utility Company**

Manufacturer of Thermostatic Heat Control and Ventilating Equipment for Electric Railways

151 West 22nd Street, Chicago, Ill.

J. H. Denton, Eastern Manager  
1328 Broadway, New York

O. W. Meissner, Representative  
10 St. Antoine St., Montreal

F. O. Grayson, Representative  
600 La Salle Building, St. Louis, Mo.



*On the majority of tests the micrometer gave the same reading at both start and finish.*

# Not



The New Miller Trolley Shoe is the ideal Current Collector. It eliminates arcing and noise. It reduces de-wirement to a minimum. It needs no lubricants. It delivers more power to the motors. It gives greater mileage. It reduces maintenance cost. It is standard on many roads.





# more than $\frac{1}{1000}$ of an inch wear on the trolley wire

That's what the Portland-Lewiston Interurban Railroad proved by *measurements* extending over nearly two years. They use

## Miller Trolley Shoes

(Sliding Contact)

at 60 miles per hour!

They are equipped with No. 0000 trolley wire. Tests were made at a dozen different points in each case within ten inches of the ears along the line—and at the end of four months only three showed any wear, and that wear was less than one-thousandth of an inch! Now you understand what we mean when we say that Miller Trolley Shoes *reduce wire wear* and consequent maintenance costs.



**Miller Trolley Shoe Company**  
West Newton, Mass.

**SPECIAL REPRESENTATIVE: Holden & White, Inc., Chicago**

**SALES REPRESENTATIVES**

Alfred Connor,  
Denver, Col.

T. C. White & Co.,  
St. Louis, Mo.

F. F. Bodler,  
San Francisco, Calif.

W. M. McClintock,  
St. Paul, Minn.

S. I. Wailes,  
Los Angeles, Calif.

W. F. McKenney,  
Portland, Oregon.

National Railway Appliance Co.,  
Eastern Representative

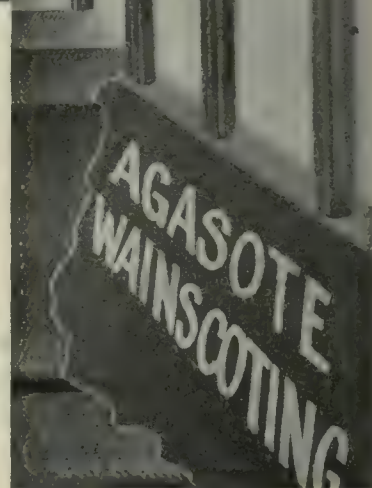
and now the Portland-Lewiston Interurban  
is 100% Miller Equipped!



# MAINTENANCE MONEY



**PANTASOTE** Curtains and **AGASOTE** Roofing—Headlining—Wainscoting have proven to be big factors in developing "better service at lower cost."



## THE PANTASOTE COMPANY

11 Broadway, New York

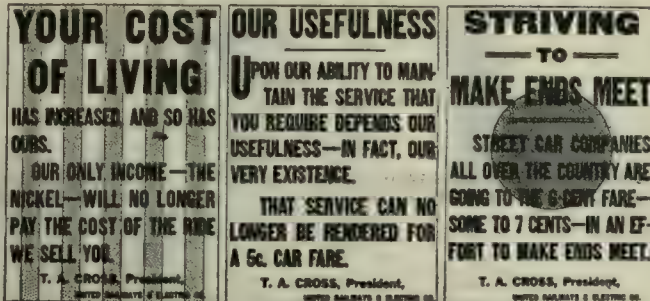
Peoples Gas Bldg., Chicago, Ill.

797 Monadnock Bldg., San Francisco, Calif.



### To 800,000 Patrons in Baltimore

SINCE the United Railways & Electric Company, Baltimore, Md., filed a petition on July 19 for a reasonable increase in fare, the company in a sustained publicity campaign has been trying to drive home the fact that the public is squarely and fairly confronted with the alternative of a service which will not meet



POSTERS USED IN BALTIMORE IN CAMPAIGN TO SECURE RELIEF FROM EXCESSIVE OPERATING BURDENS

its needs or a fare increase which will be commensurate with the higher costs of doing business.

Some of the striking car posters used are shown in the accompanying illustration. The company also told about relief granted in other cities.

Did you ever stop to think that all efforts like this can be made useless by a little thing like a poor trolley wheel?

These posters were designed to keep the minds of the public alive to the justice of increased fares—to make them willing to pay a higher rate rather than accept a service unequal to their needs.

But—when a trolley wheel, for instance, causes a block on the line—all your educational efforts are forgotten.

# HENSLEY

## Trolley Wheels Render the Service

that keeps the public satisfied. The public wants *speed*—and the higher the speed the better the service rendered by these self-lubricating wheels. The reason is found in their design and method of manufacture.

The Hensley has a positive force-feed—the ONLY trolley wheel so made. Oil it twice a week (takes 3 seconds) and forget it. Forget friction, wear and maintenance. Centrifugal force works to deliver the grease—so the swifter the pace, the better the lubrication.

Better Melting of metal insures absolute uniformity in all heats—a better wheel results.

Faster Moulding reduces the cost of producing accurate, uniform castings, eliminates delays and inaccuracies.

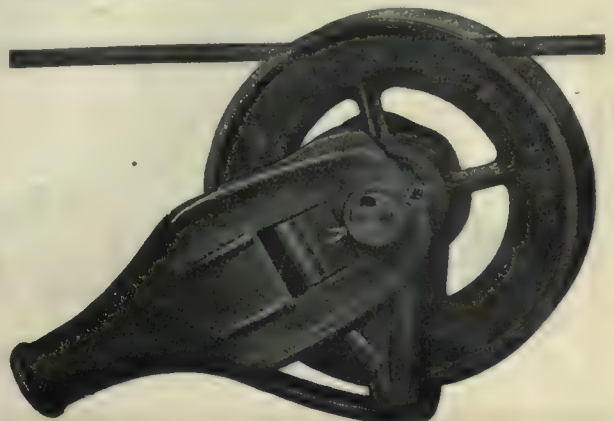
More Accurate Machinery—an up-to-date machine process enables us to furnish trolley wheels quickly, economically, accurately.

All wheels are carefully tested for defects before being packed.

Delivery and Shipping Facilities are as “speedy” as our other advanced facilities. All backed by our 15 years’ experience in Brass and Bronze foundry work and trolley wheel manufacture.

**Hensley  
Trolley & Mfg.  
Company**  
Detroit, Mich.

You'll find them nice people to do business with





# Chemists who produce —Trolley Wheels



The V-K oil-less trolley wheel (a More-Jones product) has long been considered standard equipment by many leading electric railways. A few words regarding one of the *reasons why* may prove interesting in these days, when for over forty years we have been *alloying metals* under chemical and physical laboratory supervision. Necessarily, many exhaustive tests and careful researches have been made. And so, when, years ago, we turned our attention to producing Trolley Wheels, we were equipped to solve the basic problem in securing maximum trolley wheel service—namely, that of the *composition of the metal*.

We knew that superlative *hardness* alone would not do, because such metal, once an arc occurs, induces a series of arcs, with disastrous consequences. So our chemists worked out a comparatively *soft yet very tough metal*—a metal that, so to speak, *smooths out* occasional arcs, and preserves the perfect contour of the running groove. Meanwhile our foundry had developed methods of casting whereby absolute fidelity to design and accurate balance could be secured. Incidentally, to prove this, we are prepared to use *your own formula* and produce a better average wheel than you have been getting.—All More-Jones products are specialized products, laboratory controlled. That is why it pays to use them.



## V-K



**More-Jones  
Brass & Metal Co.**

St. Louis, Mo., U. S. A.





# The Public is entirely willing to pay the price of better transportation service

The keenest brains in the electric railway industry recognize the fact that the achievement of increased revenue depends upon the cordiality of public relations *developed through better service.* YOU know this—

And you can *create* better service at a *lower price*—through the use of



Trade Mark Registered U. S. Pat. Off.

Graphite and Bronze

## Oil-less Trolley Wheel Bushings

Those who have used them longest appreciate best what they do to minimize upkeep troubles in current-collecting equipment by furnishing an oil-less trolley wheel bushing of pure and always uniform graphite.

It is possible to use a substitute for the Bound Brook Oil-less Trolley Wheel

Bushing but it is not profitable. The avoidance of loose, chattering Trolley Wheels, the attainment of sparkless transmission of current, and the reduction of burnt shunts and other harp troubles mean a saving and security worth many times the difference in the first cost between a deceitful substitute and the genuine.

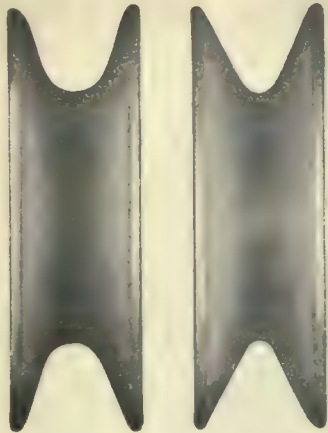
**Bound Brook Oil-less Bearing Co.**

**Bound Brook, New Jersey**

Detroit Office: 1723 Ford Bldg.



# "Bayonet" High-Speed Equipments



"U"

"V"

## From end to end of the Trolley Pole

**Keep Your Cars always "on time" and Increase your PROFITS and your SAVINGS**

### "Bayonet" Special Trolley Wheels,

made of all new metal of the highest quality. No scrap or cheap alloys used. Perfectly moulded and machined. Perfectly balanced. These features explain why they are giving double the mileage of most wheels on the market. Competitive tests have demonstrated their superiority. They eliminate all your trolley-wheel troubles.

### "Bayonet" Detachable Trolley Harp

is the only harp that can be **changed in ten seconds** without tools. Hands are the only tools required, on top of car. If necessary to take to the work-bench for repairs, adjustment and lubricating, it is eminently convenient; and the work is better done where everything needed for perfect work is at hand. This eliminates unsatisfactory patchwork on top of car.

Perfect adjustment gives perfect traction and saves a third of your trolley-wheels. Saves your power, too.

### "Bayonet" Trolley Base with Detachable Pole Clamps

is the only Base on which the pole can be **changed in one minute**, and have a perfectly aligned wheel, without tools.

Long extension springs give greatest flexibility to pole action.

Uniform wire pressure at any angle of pole. No bent trolley poles.

Large steel rollers with removable, adjustable and interchangeable all-steel bearings give very sensitive rotary action and perfect traction. This saves wheels, poles and wire. If the overhead is right, the wheel will not leave wire. If faulty overhead throws the wheel, the Heavy Buffer Spring takes the shock and prevents damage to pole.

Perfect Conductivity is afforded by sliding contact between turret and base-plate.

Built for and tested on the heaviest and highest speed inter-urban cars made, this base has reached the highest degree of efficiency and durability and stands without a par as a time saver and barrier to trolley accidents and delays to rapid transit.

*For further particulars ask for our Catalog "B."*

**BAYONET TROLLEY HARP CO.**  
SPRINGFIELD, OHIO, U. S. A.





# BOYERIZED PINS and BUSHINGS



Standard on  
scores and scores  
of electric rail-  
ways.

When you buy  
Boyerized Products,  
you buy case-hard-  
ening that is uniform—  
a quality impossible in the  
ordinary blacksmith shop.

They are good for hundreds  
of thousands of miles, and  
reduce the cost of shop in-  
spection.

And yet — their net cost is lower  
per 1000 car miles than that of old  
style pins not case hardened.

*A partial list of Bemis Car  
Truck Co.'s products:*

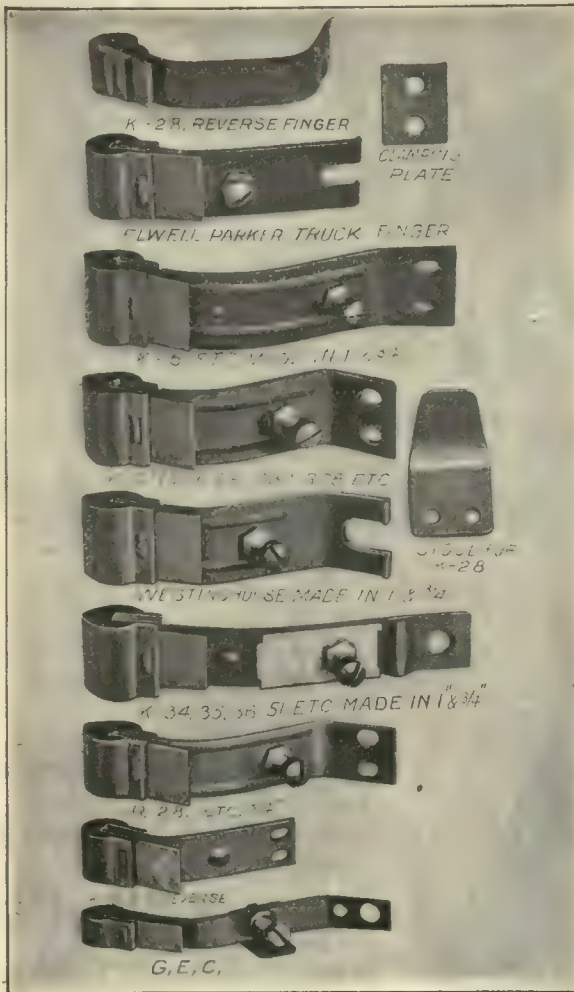
- Bemis Trucks.
- Case - Hardened Brake  
Pins.
- Case Hardened Bush-  
ings.
- Case-Hardened Nuts and  
Bolts.
- Lord Baltimore Trucks.
- Manganese Brake Heads.
- Manganese Tran-  
som Plates.
- Manganese Body  
Bushings.
- Bronze Axle Bear-  
ings.

ELECTRIC RAILWAY SUPPLIES

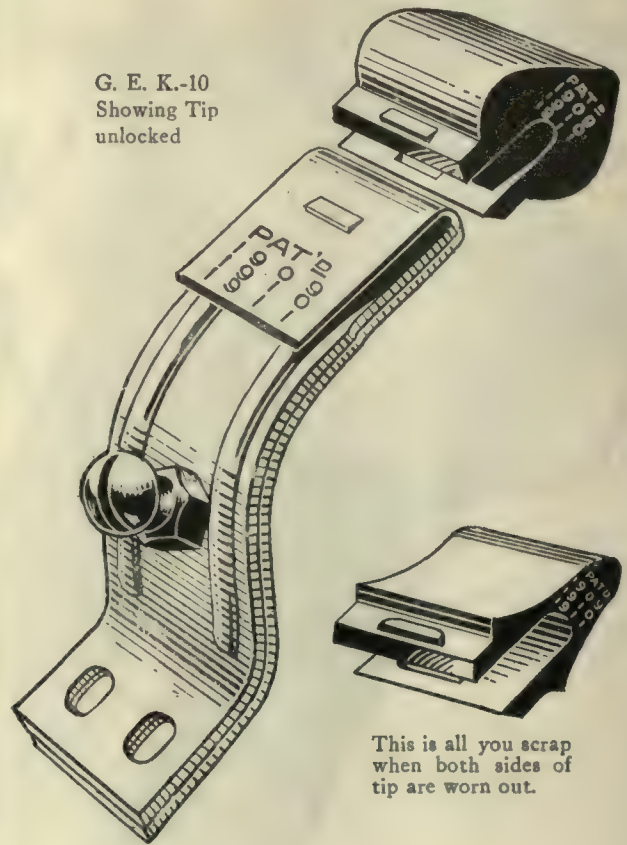
**Bemis Car Truck Company**

SPRINGFIELD MASS





G. E. K.-10  
Showing Tip  
unlocked



Half of the Large Electric Railways  
in America reduce their Maintenance Costs

by using

## Trigger Lock Reversible Controller Fingers

*Do you?*

They save time and labor in the shop  
and the motormen like them as the  
controller operates more easily.

**Trigger Lock Reversible Controller Finger**

814-8 Bath Avenue, Niagara Falls, N. Y.  
557 King Street, West Toronto, Canada



# For the Rigid Requirements of Electric Railway Service

*Results Are What Count—Here They Are:*

“The comparative results given here were obtained from tests taken from an ordinary Open Hearth steel armature shaft, and one taken from a high-grade steel, made in a “Pittsburgh” electric furnace. Both were the normal product. Heat treated in each case.

Properties	Open Hearth Steel	Electric Steel General Steel Co.
Ult. Strength, lbs. per sq.in.....	89,100	105,140
Elastic Limit, lbs. per sq.in.....	41,060	64,850
Elongation in 2 in.....	21.5%	22.5%
Reduction of Area .....	31.2%	52.3%
Fracture	Silky, small cup.	Silky, full cup.
Elastic—Torsion, lbs. sq.in.....	16,750	33,700
Shearing Strength, lbs. sq.in.....	62,400	76,000

*We Solicit Your Inquiries*



## GENERAL STEEL CO.

Public Service Building, MILWAUKEE, WIS.



# Electric Steel Forged Car Axles and Armature Shafts

*Made from Electric High-Grade Steel*

Forged and Heat Treated



Particularly Adapted to

## Electric Railway Service

We are equipped to handle the forging of axles and armature shafts from our own manufactured

## Electric Furnace Steel

We do the heat treating and rough or finished machining. We solicit your inquiries for your rigid requirements.

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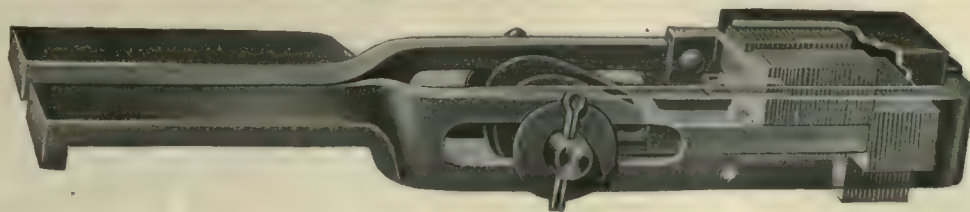
*See Comparative Results of Open Hearth  
and Electric Steel—On back of this insert.*

---

# GENERAL STEEL CO.

Public Service Building, MILWAUKEE, WIS.





# S-W BRAKE SLACK ADJUSTERS

*Save Brake Shoes and Labor*

## **More Mileage Between Inspection**

S-W Shim Slack Adjusters lengthen the period between inspection and thereby soon save their cost through the reduction of carhouse labor.

## **Brake Shoe Economy**

S-W Shim Slack Adjusters decrease brake-shoe wear 20 to 75 per cent. because they assure uniformity of wear impossible to secure otherwise.

## **Stopping Flat Wheels**

S-W Shim Slack Adjusters hold the brake shoes in correct position at all times, taking up the wear automatically.

## **Saving 16c. per Car per Day**

Sixteen cents per car per day is the saving made by one electric railway official, who keeps close cost data.

Let us give you the details of this accounting. It will interest every operating official.

You will see then how S-W Shim Slack Adjusters pay for themselves in six months and then go on earning 200 per cent. dividends.

## **Promoting Safety**

Besides saving labor, brake-shoe expense and flat wheels S-W Shim Slack Adjuster promotes safety. The motorman always knows where to "find his brakes." They will not fail him in an emergency, but GRIP firmly and surely.

## **Applicable to Every Truck**

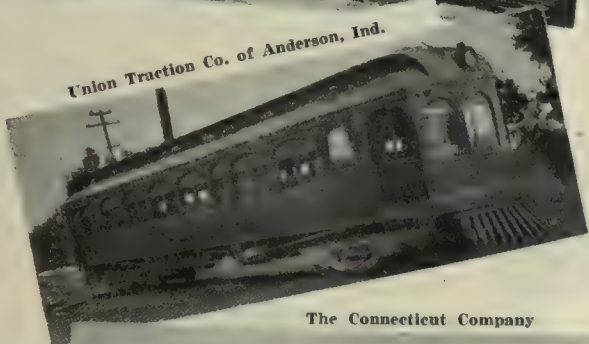
It is the practical slack adjuster for it can be made to fit any truck. Small metal shims drop beneath the fulcrum of the brake lever whenever slack occurs. These shims always act—there is no mechanism to get out of order.

In daily service on over 100 electric roads. Give us a trial order; equip a few of your cars, and tryout the Adjuster. We are confident that after a trial you will equip all of your cars.

New York Municipal Railway



Union Traction Co. of Anderson, Ind.



The Connecticut Company



# SMITH-WARD BRAKE COMPANY

233 37th Street, BROOKLYN, N. Y.



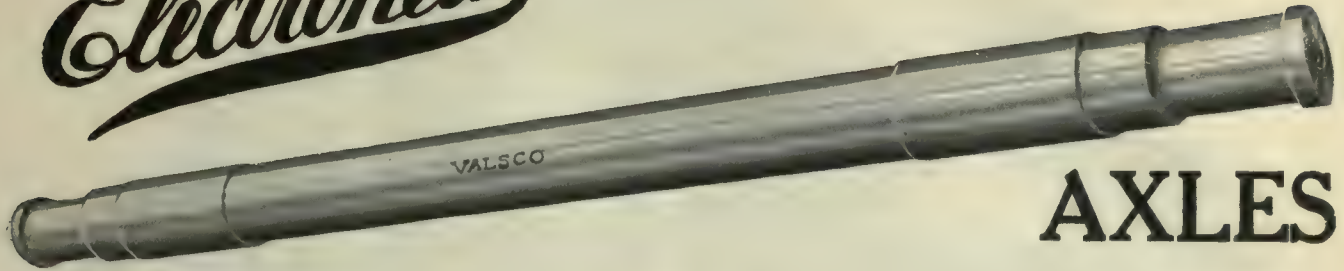
*The*  
**QUALITY  
MARK**



**The Tool Steel Gear & Pinion Co.**  
Cincinnati, Ohio



# "Electroheat"



## AXLES

### YOU SHOULD USE THEM

**Because**—Their use assures a minimum number of axle failures due to breakage, bending and excessive journal wear.

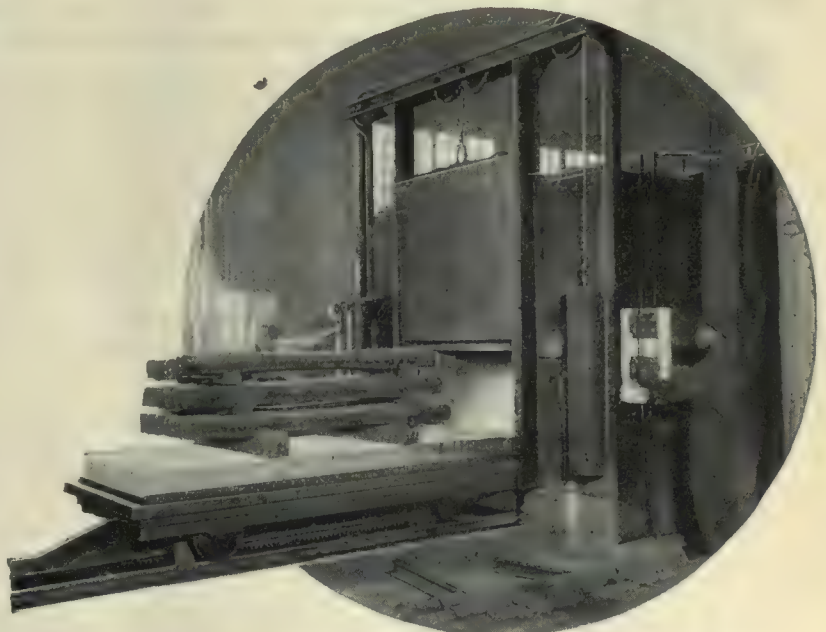
**Because**—During their manufacture from the open hearth to the inspection bed they are under the surveillance of trained experts.

**Because**—They are heat treated by a process that is metallurgically right.

**Because**—This heat treating process assures not only a superior but a uniform product.

**Because**—Electroheat Axles not only meet A. E. R. A. standards — they exceed them.

**Because**—Electroheat Axles give satisfaction.



"If Heat-Treated Electrically—It's a VALSCO"

A charge of "Electroheat" Car Axles entering the Electric Furnace for heat-treatment

## LACLEDE STEEL COMPANY

General Offices: Federal Reserve Bank Building

ST. LOUIS, MO., U. S. A.





## Nuttall Trolley Wheels Harps and Bases

**Trolley Wheels.** All Nuttall wheels are cast of new phosphor-bronze, no scrap metal used—are cast in moulds of green sand to prevent the warping occurring through the use of baked cores. All machining is done with the use of jigs to insure uniformity. The grooves in the wheels are of an approved style that does not permit the binding of the wire nor the wearing of ruts.

**Trolley Harps** are made of malleable iron in two types, those that have a shank fitting into the end of the pole and another that fits over the end of the pole—both are secured by rivets. The location of the contact springs prevents their being unintentionally cut by the rotation of the wheel and at the point of current collecting contact are protected by renewable contact washers. A rolled steel axle pin with a low frictional resistance surface is so installed that its removal is a matter of only a minute or two.

Lubrication in all but high-speed wheels is accomplished through the use of graphite bushings and in the latter the bushings are supplemented by oil chambers cored in the hub.

**Trolley Bases.** Four different designs of bases form the principal ones manufactured, Nos. 11, 13, 14 and 15. Nos. 11, 13 and 14 range in weight from 115 to 135 pounds, are substantially constructed and give service on city or interurban lines. No. 15 weighs but 75 pounds; has all the durability of the other base but is designed primarily for city service only.

R. D. NUTTALL COMPANY  
Pittsburgh, Pa.

# Nuttall Gears

EVERY GEAR REGISTERED





## Pedigreed Gears

**T**HE registering of every Nuttall Gear was begun more than twelve years ago. By giving each gear an identity, it made possible the gathering of a great mass of data on gear performance, and the results are evident in the superior quality of Nuttall Gears and Nuttall Engineering Service today.

But the Nuttall Company is not resting content with what has been done. It has not for a single moment relaxed its efforts to produce better and better gears. So Nuttall registration continues not only for your protection, but as a means of achieving still greater results.

*Let us know your requirements*

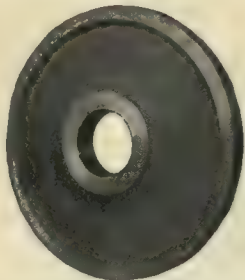
**R. D. NUTTALL COMPANY**  
Pittsburgh, Pa.

# Nuttall Gears

**EVERY GEAR REGISTERED**







48-Inch Turbine Bucket Wheel



24-Inch Rough Turned Gear Blank



21-Inch Street Car Wheel



17 $\frac{3}{4}$ -Inch Automobile Flywheel Blank



24-Inch Shaft Coupling

# CAMBRIA CIRCULAR FORGED SECTIONS

## *What They Are and How They Are Made*

**C**AMBRIA circular or annular forged sections are made by a combined rolling and hydraulic forging process which thoroughly works the metal and puts it in the best possible condition to stand the hardest requirements of actual service.

The sections which can be made may be roughly described as circular or annular sections weighing not less than 100 lbs. These include the following:

Automobile Flywheel Blanks  
Band Wheel Flange Blanks  
Bevel Roller Blanks  
Gear Blanks of Various Kinds  
Car Wheels of Various Kinds

Crane Wheel Blanks  
Industrial Wheels  
Pipe Flange Blanks  
Shaft Coupling Blanks  
Turbine Discs

Further descriptions of some of the methods used, illustrations of the products and the reasons why they are superior to those made by ordinary methods, will appear in this space from week to week.

## MIDVALE STEEL AND ORDNANCE COMPANY CAMBRIA STEEL COMPANY

*General Sales Office, Widener Building, Philadelphia, Pa.*

*District Sales Offices, Atlanta, Boston, Chicago, Cincinnati, Cleveland, Detroit, New York, Philadelphia, Pittsburgh, San Francisco, Salt Lake City, Seattle, St. Louis*

CONSOLIDATED STEEL CORPORATION, 165 Broadway, New York, is the sole exporter of our commercial products. Address all export inquiries to them.

*"We Want You to Become Better Acquainted With Us" Series. Number 3-1.*





# COSMIC METAL BEARINGS

**Prevent Hot Boxes—Eliminate Babbitting**

**If we fail to eliminate your Bearing Troubles,  
no matter how chronic, we make no charge.**

Cosmic Metal bearings for armature, axle or motor are made exceptionally strong and tough, to give long life and a slow, even rate of wear. Under actual working conditions and tests they have proved far more dependable than bearings made of other metals.

They have sufficient strength to carry any load and are easily lubricated. If, through accident or other cause, they should not be properly lubricated, they will continue to run *without injuring the machinery* until attended to.

This is a very important point, because ordinary bearings which are improperly lubricated, or hard to lubricate, will generate intense heat. This rapidly causes the bearing to melt, or to fuse and stick, causing serious and costly damage to machinery.

Bearings made of Cosmic Metal will not stick or grab the shaft or axle, even though lubrication does not reach them. They prevent hot boxes with their resultant accidents, and in the end are a much safer and more economical equipment than any other bearing. Let us send further information.

**COSMIC METAL COMPANY**  
420 Walnut Street, Philadelphia



# Storage Batteries in Electric Railway Service

## LOAD REGULATION

For carrying peaks and fluctuations of load, especially in connection with water-power developments or where power is purchased on the basis of maximum demand, the "Chloride Accumulator" is adapted.

## LINE REGULATION

Due to the present high price of copper there are cases where the use of a battery for maintaining voltage is more economical than the purchase of copper for feeders. The "Chloride Accumulator" has been largely used in this service by many railways.

## STANDBY SERVICE FOR EXCITER BUS

It is standard practice to install a storage battery connected to the Exciter Bus to prevent interruption in the supply of current for field excitation. The "Exide" Battery is used for this service.

## OIL SWITCH SERVICE

Storage batteries are used in power houses and sub-stations for the operation of oil switches and supplying current for pilot lamps and emergency station lights in case of failure of the power supply. For this service the "Chloride Accumulator" and the "Exide" battery are used.

## STORAGE BATTERY STREET CARS

For infrequent service or for conditions where trolley wires are prohibited, storage battery cars offer the most economical and profitable solution of the transportation problem. The "Nycap-Exide" Battery has been largely used in this service. In New York City alone there are in operation nearly 200 storage battery cars equipped with "Nycap-Exide" Batteries.

## MULTIPLE-UNIT CONTROL

The "Exide" Battery is used by a number of railways for furnishing a supply of low voltage current to be used in connection with the operation of multiple-unit control systems.

## INTERURBAN CAR LIGHTING

A number of interurban electric railway companies have installed batteries on their cars to maintain steady illumination and to overcome fluctuations caused by changes in line voltage, interruptions in third rail at crossings and switches or by temporary failure of power supply. For this service the "Exide" Battery is particularly adapted.

## HEAD AND TAIL LIGHTS

The "Exide" Battery is being used in connection with head lights and tail lights for furnishing current in case of interruptions in power supply.

Detailed information on batteries for any of the above services  
can be secured from any sales office of the company.

# THE ELECTRIC STORAGE BATTERY CO.

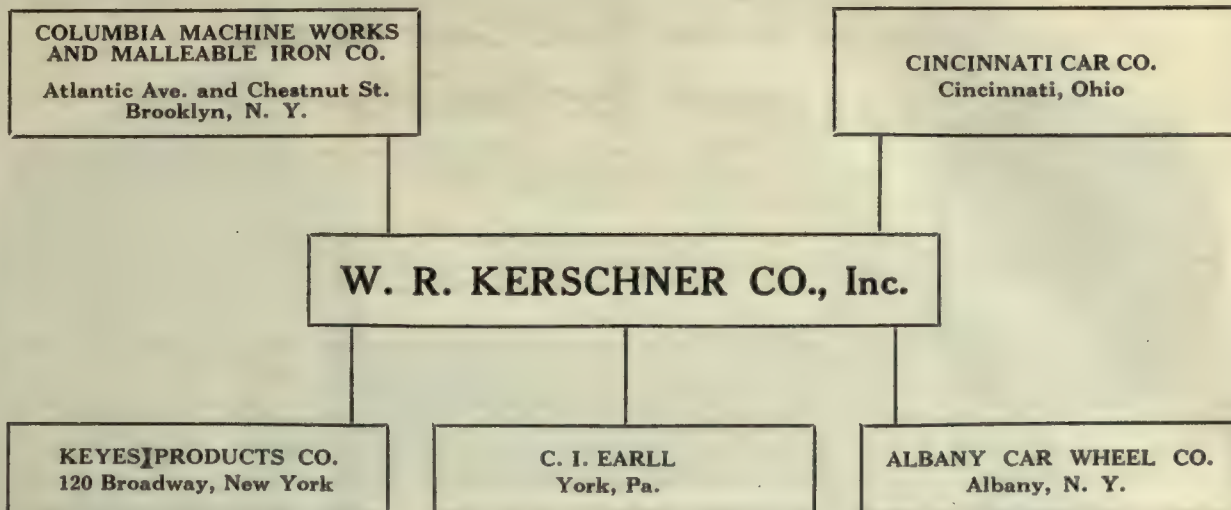
Manufacturer of

The "Chloride-Accumulator", The "Tudor Accumulator"

The "Exide", "Nycap-Exide", "Thin-Exide" and "Ironclad-Exide" Batteries

New York Boston Chicago Washington PHILADELPHIA, PA. Rochester Detroit Minneapolis St. Louis  
Cleveland Atlanta Pittsburgh 1888-1919 San Francisco Denver Kansas City Toronto





# Centralize Your Buying

We represent the above companies as eastern sales agents.  
We sell the following equipment for electric railways:—

Axles  
Cars, Passenger, Freight and Express  
Cleaners and Scrapers, Track  
Couplers, Car  
Fenders and Wheel Guards  
Gates, Car  
Registers and Fittings  
Trucks  
Ventilators, Car  
Ceiling, Car  
Headlining  
Roofing, Car  
Catchers and Retrievers,  
Trolley  
Wheels, Car

Armature Shaft and Axle  
Straighteners  
Armature Buggies and Stands  
Babbitting Molds  
Banding and Heading Machines  
Car Hoists  
Car Replacers  
Coil Tapping Machines  
Coil Winding Machines  
Pinion Pullers  
Pit Jacks  
Signal or Target Switches  
Tension Stands  
Armature and Axle Bearings  
Armature and Field Coils

Bearings (Axle and Armature)  
Brush-holders and Brush-holder  
Springs  
Brake, Door and other Handles  
Brake Forgings, Riggings, etc.  
Car Trimmings  
Commutators  
Controller Handles  
Forgings of all kinds  
Gear Cases (Steel and Malle-  
able Iron)  
Grid Resistors  
Third-rail Shoe Beams and  
Accessories  
Trolley Poles (steel) and wheel

When you are in the market for any of the above equipment or material send us your inquiries. We will personally attend to your requirements. In other words, besides the goods we give you service worth buying. Centralize your buying.

## **W. R. Kerschner Co., Inc.**

50 Church Street, New York



## Carnegie Rolled Steel Gear Blanks

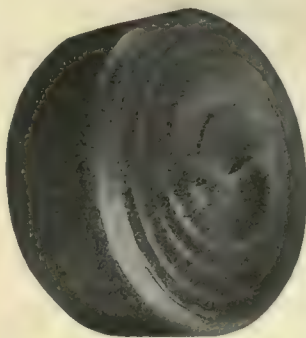


Fig. 1  
Solid disc from which  
blanks are rolled

the solid rolled steel wheel is now well known to railway officials as the most reliable wheel for heavy and continuous service. The chief improvements made over the original Schoen method are—

1—A rolled steel slab was substituted for the original cast blank. By reason of the additional amount of work which had been performed upon the steel before the blank entered the wheel press and rolls this produced a wheel with a closer grained structure.

2—The rolled steel slab was replaced by a rolled steel disc. By this substitution the additional work due to rolling is supplemented by a blank which is forged cross-grained to the axis of the wheel and then the tread and flange is further rolled, with the result that in the finished article the finest texture is invariably found on the surfaces liable to wear.

It has been well demonstrated that by this method of manufacture it is possible to produce the very highest quality of wheels for electric and steam railway service—wheels in which there is the proper distribution of metal as between hubs, webs and rims.

Due to that success Carnegie Steel Company has offered to the trade rolled steel gear blanks made in the same way from selected rolled steel discs. These are furnished to gear cutters for further treatment and use in high duty machinery. Service use has established the superiority of gears cut from rolled steel blanks just as thoroughly as service had demonstrated the superiority of the solid rolled steel wheel.

Fig. 1 shows the disc rolled from a cylindrical bloom and cut to length by a rotary shear specially designed for that purpose. The longitudinal axis of this disc is the center of the gear. It is then placed in a rolling mill from which it receives simultaneously forging and rolling by which is produced a close grained structure which, when properly heat treated, although it will of course wear out in time, will never break. The blank as it appears ready to have the teeth cut is shown in Fig. 2.



Fig. 3  
Worn out but not broken

In various lines of industry the question of gears has been a constant problem.

This problem is similar to that common among railway officials some fifteen years ago when the increased sizes and overloading of cars created a demand for better wheels.

To meet that demand Charles T. Schoen, after careful work and experimentation, invented a process by which wheels could be rolled, and on October 5, 1903, were produced the first solid rolled steel wheels made in the United States.

These first wheels were rolled from cast steel slabs and, despite defects due to imperfections in equipment and method of manufacture, gave most excellent service and some of them attained phenomenal runs. This demonstrated the merits of the solid rolled steel wheel.

July 1, 1908, Carnegie Steel Company purchased the Schoen Wheel Works and since that date has constantly improved its products, so that

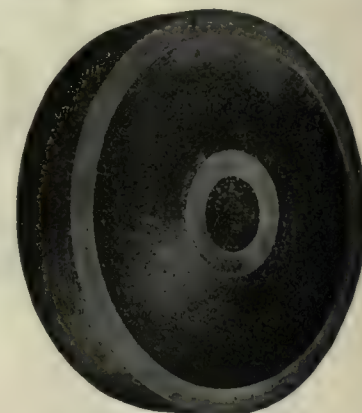


Fig. 2  
Rolled Steel Gear Blank

A gear worn out but not broken is shown in Fig. 3. It has been in continuous service on the bridge drive of a 50-ton hot metal crane for more than a year. The crane loaded weighed about 100 tons and served at a hot metal mixer where, due to the unavoidable presence of dirt, carbon in a graphitic form, etc., the service was unusually severe, and where the use of cast gears had been most inadequate and unsatisfactory. The teeth of this gear are worn to a thickness of  $\frac{1}{8}$  in. at the pitch line without signs of fracture or breakage.

Carnegie Steel Company makes a complete range of carbon steel blanks for spur gears 12 to 36 inches in diameter. Its engineers will be glad to confer with users requiring the very best service and heavy duty work.

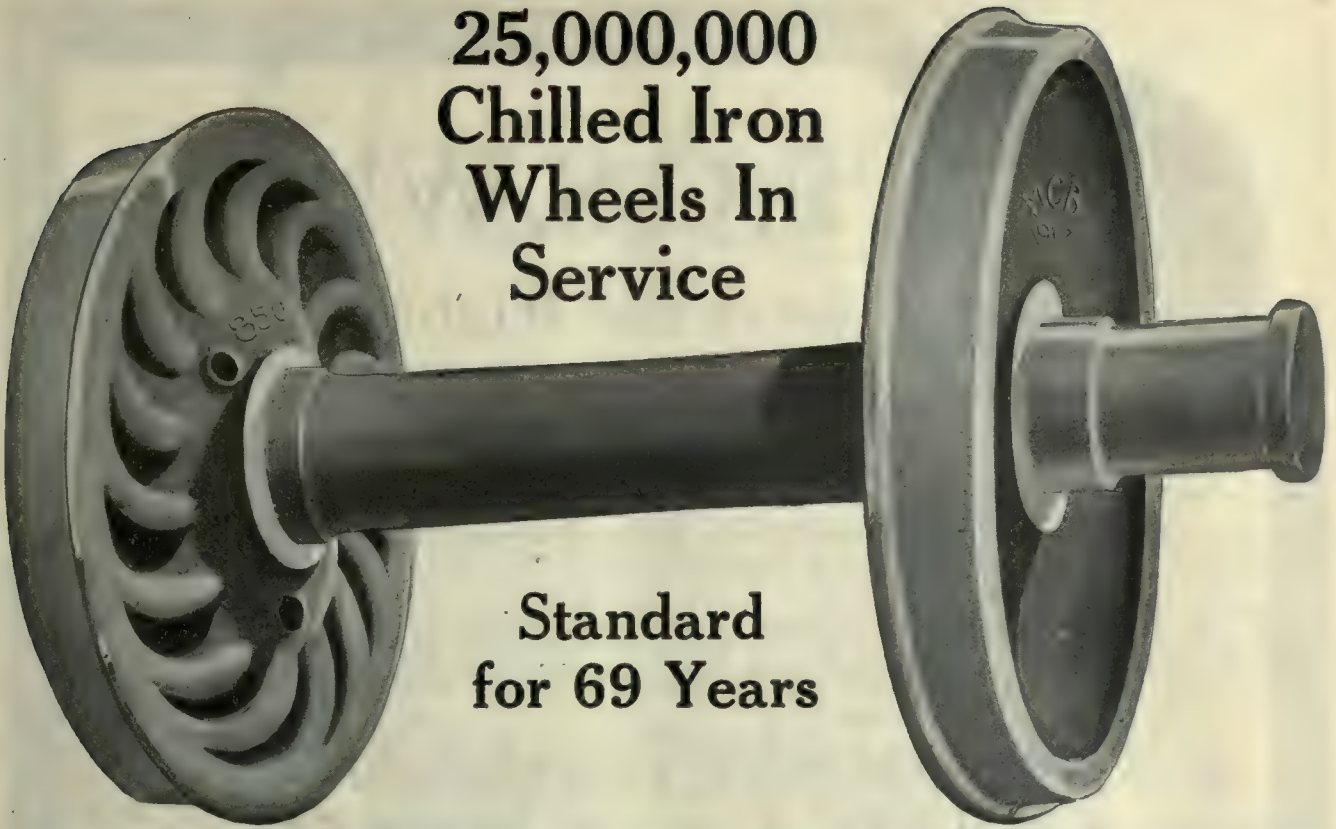
## Carnegie Steel Company

464 Frick Building Annex, Pittsburgh, Pa.



# 25,000,000 Chilled Iron Wheels In Service

Standard  
for 69 Years



## The Chilled Iron Wheel Has Performed Its Every Function at a Minimum Cost

### *For Freight Cars*

95 PER CENT. of all cars in this type of service are equipped with Chilled Iron Wheels, provided for by the MASTER CAR BUILDERS' STANDARDS, as follows:

625 lb. Wheel for Cars of 30 tons capacity.	725 lb. Wheel for Cars of 50 tons capacity.
700 lb. Wheel for Cars of 40 tons capacity.	850 lb. Wheel for Cars of 70 tons capacity.

### *For Street Cars*

The Chilled Iron Wheel is Standard for Street Car Service in 95 PER CENT. of all cities in the United States and Canada, operating 100 cars or over.

### *The Reason*

Chilled Iron Wheels possess a graded hardness of structure, which is ideal for service, namely: HARD TREAD, SOFT PLATES AND SOFT HUB; Chilled Iron will not CRUSH OR FLOW under heavy loads.

A demonstration of the BEARING POWER OF CHILLED IRON is found where heavy hoisting cranes are operated, each wheel carrying 105,000 pounds.

Chilled Iron Wheels under cars of 70 tons capacity are only required to carry 25,000 pounds each.

### *The Conclusion*

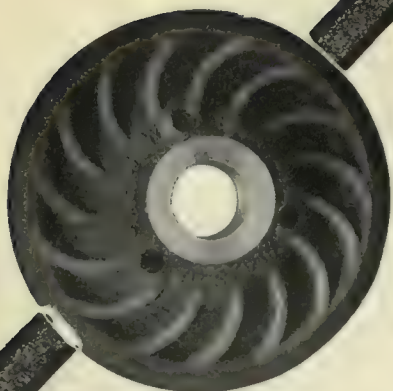
The uninterrupted use of Chilled Iron Wheels for 69 years under 95 PER CENT. of the nation's equipment proves that no other material can match them for economical and dependable service.

## ASSOCIATION OF MFRS. OF CHILLED CAR WHEELS

1229 McCormick Bldg., Chicago

Representing forty-eight wheel foundries throughout the United States and Canada. Capacity 20,000 Chilled Iron Wheels per day.





# F.C.S. Wheels

have the Right Material  
in the Right Place

The surface of tread and flange contains three and one-half per cent carbon white iron, harder than tool steel, insuring long wear.

The softer hub permits easy machining.

The arched face plate gives additional strength.

## Reasons why you should use GRIFFIN F. C. S. WHEELS

Less wearing away of metal of the flange.

Less chance for derailment at switch points and on curved worn rail because of freedom from sharp flanges.

Less wearing away of metal at the gauge of rail because the rubbing friction is at a minimum.

Less resistance to movement of the car.

Less resistance on curves.

Less power required for traction.

Less metal worn away from brake shoe per unit of work.

Less reduction in diameter per unit of service, therefore less labor in removing wheels to maintain the same diameter of wheel throughout the same car.

## Griffin Wheel Company

McCormick Building, Chicago, Ill.

### FOUNDRIES:

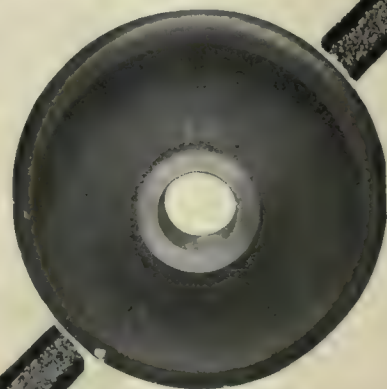
Chicago

Detroit  
St. Paul

Boston  
Tacoma

Los Angeles  
Kansas City

Denver





# Joke!

Somebody told one of our steady customers that we weren't building the popular Standard Light Weight One Man Safety Car

He couldn't get it across because our customer knew that we actually built the first one-man cars several years ago and had been building various types ever since.

We recommend the Standard Birney Car. Write for details.

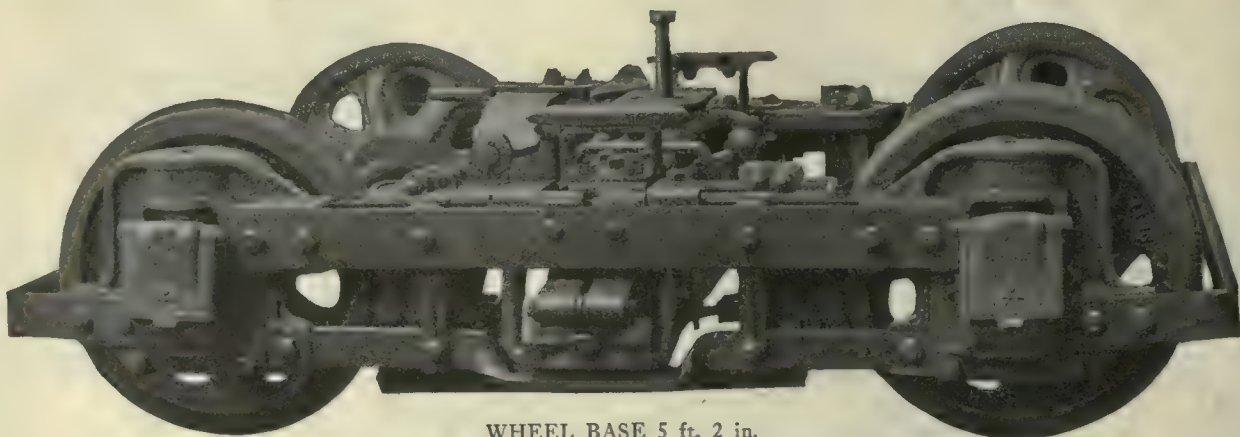
St. Louis Car Co.  
St. Louis, Mo.



# TAYLOR R. H. TRUCKS

REDUCED HEIGHT

Insure Easy Riding Cars and Low Maintenance



WHEEL BASE 5 ft. 2 in.

Mounted on 26-Inch Wheels With Springs Over Journal Boxes  
Designed to Mount Centre and End Entrance Cars Low Down

SWING MOTION AND FULL ELLIPTIC SPRINGS

MOTORS AND BRAKES INSIDE HUNG

WEIGHT OF CAR BODIES 16,000 TO 22,000 LBS.

HEIGHT FROM RAIL TO CAR BODY BOLSTER  $22\frac{3}{4}$  IN.

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The Public Wants the Low-Level Car  
—and Speed—and SAFETY!



TAYLOR ELECTRIC TRUCK COMPANY

SEND FOR PORTFOLIO

TROY, N. Y.

ESTABLISHED 1892





Accidents may happen. Be prepared to keep  
bodies clear of the wheels by installing

## H-B Life Guards

Accidents **will** happen. It is useless to deny it. But accidents will be robbed of most of their gravity **if your cars are equipped with H-B Life Guards.** The picture and the head lines of this advertisement tell the story. And this is **more** than an advertisement. It

is a message to roads which are fighting to gain public good-will as a means toward their just claims for increased revenue. One accident outweighs all the **arguments** in the world. Don't let that accident be a bad one if H-B Life Guards can prevent it. Think it over.

*Write for the long list of roads H-B Guarded.*

**The Consolidated Car Fender Co.**

Providence, R. I.

*General Sales Agent*

**Wendell & MacDuffie Co.**

61 Broadway, N. Y.



# SAFETY CARS for Fully Equipped



**T**HE Safety Car introduced a new era in electric railway practice. There is not a city property that cannot profitably operate safety cars at least some of the time on all lines, or all the time on some lines.

A still greater era has been opened up through the service rendered by the National Safety Car & Equipment Company in supplying fully equipped safety cars, ready to run when received.

From the very birth of the safety car, officers of this Company have been prominent in its development. Their fingers have been at all times on the pulse of the situation.

*Ready to Run*

*Safety Car*

George H. Tontrup, President  
E. T. Bronenkamp, Vice President  
Nic Le Grand, Selling Agent  
W. R. Kerschner, Inc., Eastern Selling Agent

**National Safety Car &  
St. Louis**



# Immediate Delivery Ready to Run



**T**HROUGH personal contact they are thoroughly acquainted with the conditions which face electric railway officials, and are in position to solve many of their problems.

No matter what difficulties may seem to lie in the path of an electric railway which seeks to benefit by the immediate acquisition of Safety Cars, there is a possibility that this organization may be able to assist in clearing away the barriers. In any event, a frank discussion of conditions will, without committing you in any way, place before you the details of the many-sided service we are organized to give.

The time for action has come. Investigate! Learn now all that is embraced in our Service.

*Delivered Immediately*

*Fully Equipped*

**Equipment Company**  
**Missouri**

We are representatives  
of Hale & Kilburn Corp.  
West of the Mississippi River



# SKEE BALL FOR TROLLEY PARKS

The Bowling Game with a Punch that has a thrill for player and spectator alike. The leaping balls give a life to the game that no crowd can resist. A smashing big success for five years and daily growing stronger.



In 1917 the PHILADELPHIA RAPID TRANSIT COMPANY installed in their WILLOW GROVE PARK 5 SKEE-BALL Alleys. SKEE BALL became popular immediately, and alleys earned more than twice their cost during the season. Last year the TRACTION COMPANY installed 5 additional games. The 5 SKEE-BALL Alleys during 1917 and the 5 additional alleys during 1918 earned together over \$12,250.

SKEE BALL will earn just as much per alley in any good ELECTRIC TRACTION PARK and will continue one of the most popular and active features a Traction Company can install.

A number of Electric Railway Companies who own their Trolley Park have from two to ten SKEE-BALL Alleys in profitable and successful operation.

*Write for Illustrated Catalogue.*

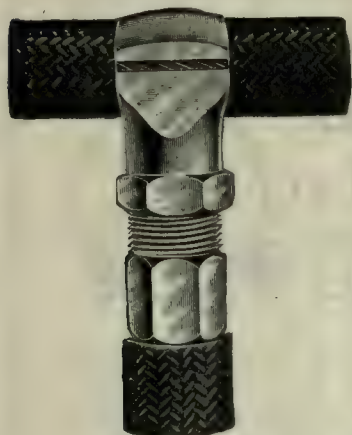
*It will be wise to order alleys two months before opening the park season.*

## The J. D. Este Company

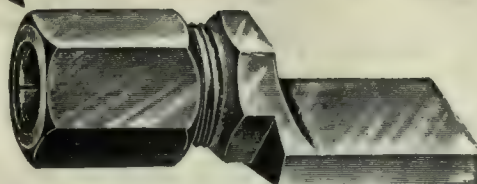
Owners — Patentees — Distributors  
1536 Sansom Street, Philadelphia







Dossert Cable Tap

Dossert  
Front-Connected  
Lugs.

Dossert 2-Way Connector.

The best possible, lowest cost connection  
for every type of wire and cable

## DOSSERT CONNECTORS

From the connection of two small wires to the jointing of the heaviest conductors where unimpeded flow of current is imperative, Dossert Solderless Connectors *cut costs* to the bone. They eliminate trouble from insulation spoilage by heat of soldering,

and replace elaborate preparations with the simple tightening of a couple of nuts. The exclusive DOSSERT tapered sleeve gives large contact area held permanently tight. The power houses of the leading electric railways employ them in large quantities.

Write for catalog describing the Dossert way

## DOSSERT & COMPANY

H. B. LOGAN, President

242 West 41st Street, New York

# ROEBLING ELECTRICAL

*We make with strict attention to  
quality of materials and workmanship*

Transmission Wire

Trolley Wire

Telephone Wire

Steel Contact Wire

Wire Strand

Insulated Wires and

Cables of all kinds

**John A. Roebling's Sons Co.**  
Trenton, N. J.

*Branches:*

New York Boston Chicago Philadelphia Pittsburgh  
Cleveland Atlanta San Francisco Los Angeles  
Seattle Portland, Ore.

# WIRES AND CABLES



# CYPRESS

"THE WOOD ETERNAL"

is NOT the *Best Lumber for ALL Railway Purposes*. For certain specific applications, however, in which railways have large lumber requirements, the use of all-heart Cypress develops very large *economies in maintenance costs*. For example, the Railway Signal Association in its standard specifications for wood to be used for "Trunking and Capping" has always placed all-heart Cypress among the first choices in the list of suitable woods.

The Railway Signal Association makes its recommendations as a result of definite *knowledge* of the subject, and its membership includes many able men who are Cypress enthusiasts. We gladly refer all doubters as to Cypress superiority to any well-posted railway engineer who has had experience with Cypress, "the wood eternal."

The same conditions of service which make Cypress superior for "Trunking and Capping" are present in many other railway lumber requirements, such as

# FENCING

and similar purposes where the material is exposed constantly to the weather, and where it is consequently essential that it shall be highly capable of *resistance to decay*. That is the great and particular value of Cypress—it is *highly resistant to decay*. (All-heart especially.)

If railway men in general will study the question of wood durability for other uses as carefully as Railway Signal men have studied it in connection with "Trunking and Capping," there will be a lot more all-heart Cypress used in railway service—to the very great economy of the companies using it.

*Our data is at your service.*

## SOUTHERN CYPRESS MFRS' ASS'N

1265 Hibernia Bank Building, New Orleans, La., or  
1265 Heard National Bank Building, Jacksonville, Fla.

# 3

(Three)

## Simple Parts

and only three parts, make up White's Porcelain Trolley Hanger. This is a big advantage in shortening the time and labor of installation and in lengthening the service life of the hanger.



## WHITE'S

Porcelain

## Trolley Hanger

consists of the sherardized malleable iron yoke, the heavy glazed porcelain insulator and the "stud"—a standard bolt, sherardized or furnished in bronze.

The illustration will convince you of the ease of installation and alignment. You can see that this hanger will give service, too—there is no possibility of the insulation "breaking down" or cracking.

We will send you a sample and it will tell its own story to you. Let us give you quotations on complete hangers or parts which we have in stock for

**Immediate Delivery**

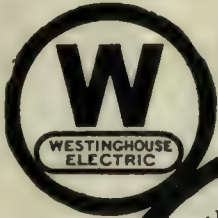
**T. C. WHITE**  
**Electrical Supply Co.**

1122 Pine Street, St. Louis, Mo.

Foreign Representatives: Forest City Electrical Service Supply Co., Salford, England



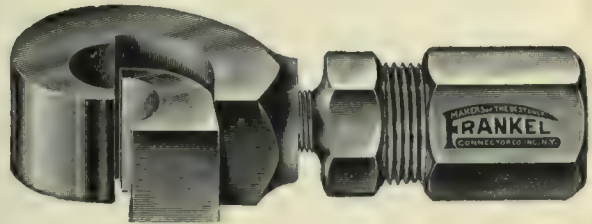
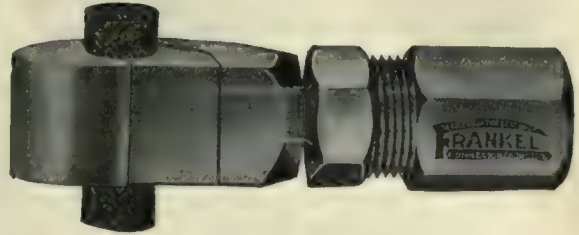
# Frankel Solderless Cable Taps



The quickest, the easiest way to connect *without solder*, a branch of solid wire or stranded cable to the main wire

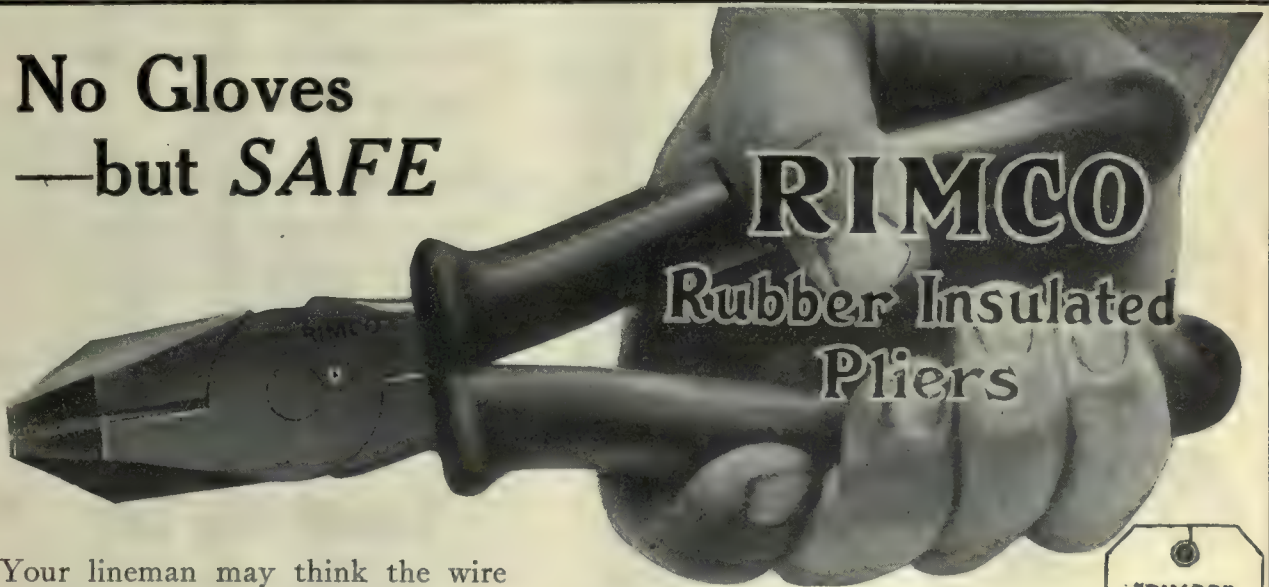
Simply place the hook over bared part of cable, insert the shoe and screw up and good contact is made. Insert the bared end of branch cable in the connector and tighten the compression nut. Supplied for all sizes cable or wire.

Send for miniature catalogue 1B-3  
Westinghouse Electric & Mfg. Co.  
East Pittsburgh, Pa.  
Sole Agent in the  
United States



## Save Labor—Save Solder—Save Wire

### No Gloves —but *SAFE*



Your lineman may think the wire he is about to cut is dead—but he probably won't give it much thought at all if he is using Rimco Rubber Insulated Pliers. He *knows* he's safe. Rimco is the standard, up-to-date,

side-cutting plier and is tested and guaranteed by the Electrical Testing Laboratories to 10,000 volts.

Rimco Pliers are extensively used by electric railways. *Write for details.*

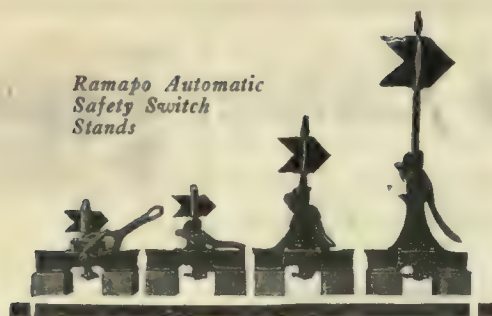
### Rubber Insulated Metals Corporation, Plainfield, N. J.

SALES AGENTS—Electric Service Supplies Co., 17th and Cambria Sts., Philadelphia  
Canadian Agent: Lyman Tube & Supply Co., Ltd., Montreal, Toronto and Winnipeg.



Exclusive Export Agents  
International  
*Western Electric Company*





Ramapo Automatic  
Safety Switch  
Stands

## RAMAPO Automatic Switch Stands

*"Safety First"*

That kind of equipment must be built or purchased by a railroad which will have 100 per cent. efficiency; otherwise the railroad nullifies and negatives the safety-first idea. A "safety-first" switch stand is a good object lesson in the safety-first movement.

The Automatic Safety Switch Stand if trailed when set wrong, allows the points to be thrown by the first pair of wheels, and they remain in this position until reset by hand or the switch is trailed from the other side.

The Automatic Return Switch Stand allows the points to be forced open when trailed, and they return to their original position after each pair of wheels pass. This makes the operation similar to a spring switch, which can be set for either side by the use of the stand.

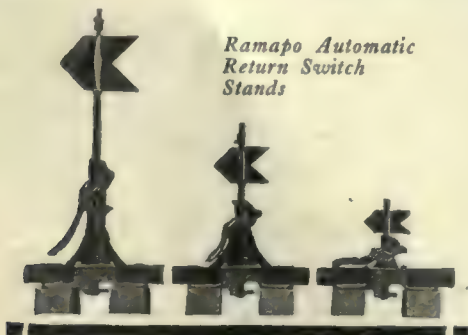
**Tee Rail Special Work for Interurban  
Lines and Private Right-of-Ways**

***Manganese Construction***  
***Street and Steam Crossings a Specialty***

**·RAMAPO IRON WORKS·**

· HILLBURN · NEW YORK ·

Plants at HILLBURN NY and NIAGARA FALLS NY New York Office 30 CHURCH ST.

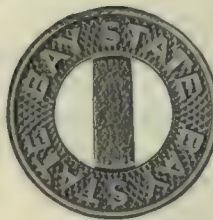


Ramapo Automatic  
Return Switch  
Stands

## Metal Tickets

for

Fare Register



Enlarged to 1½ times actual size

**Nickel-Silver  
Bronze or Brass**

Designs developed according to your ideas and subject to your approval. We make the metal, the dies and the tickets.

We have the experience, the equipment, the capacity for rapid quantity production.

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*Established 1802*

**Waterbury, Conn.**

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Boston  
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Every bit of metal that goes into "Eureka" products, whether it is brass, phosphor bronze or copper, is new. Not a grain of scrap is used and every part is guaranteed to be as fine as first grade material, expert workmanship and rigid inspection can make it.

We carry a large stock of standard parts and can ship your orders with the least delay. Special parts can be made to your order and our plant is so thoroughly up-to-date in man-power and equipment that our deliveries will surprise you.

*Our greatest output is satisfaction. Let us supply you.*

Write for Catalog covering materials wanted. Information and estimates gladly furnished

**The Eureka Company**  
North East, Pa.

We also manufacture Commutators, Brush Holders, Controller Contact Fingers and Segments and Sleet Cutters, Bearings and Bushings, Copper and Bronze Forgings and Castings, Line Materials, etc.

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for Electric Railways

Whether it's to remove snow, ice, mud and debris from track, switches and frogs, or to *clean the rails* before welding or jointing, there's a Paxson Broom for *just that service*. Split bamboo bristles or steel wire splints—with or without a chisel on the other end of the handle. You can cut costs here—and *get better service*. Write for data.



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Destruction of railroad bridges and washouts along river banks are easily preventable. Anticipate the ice gorge by blasting the frozen rivers that menace your right of way.

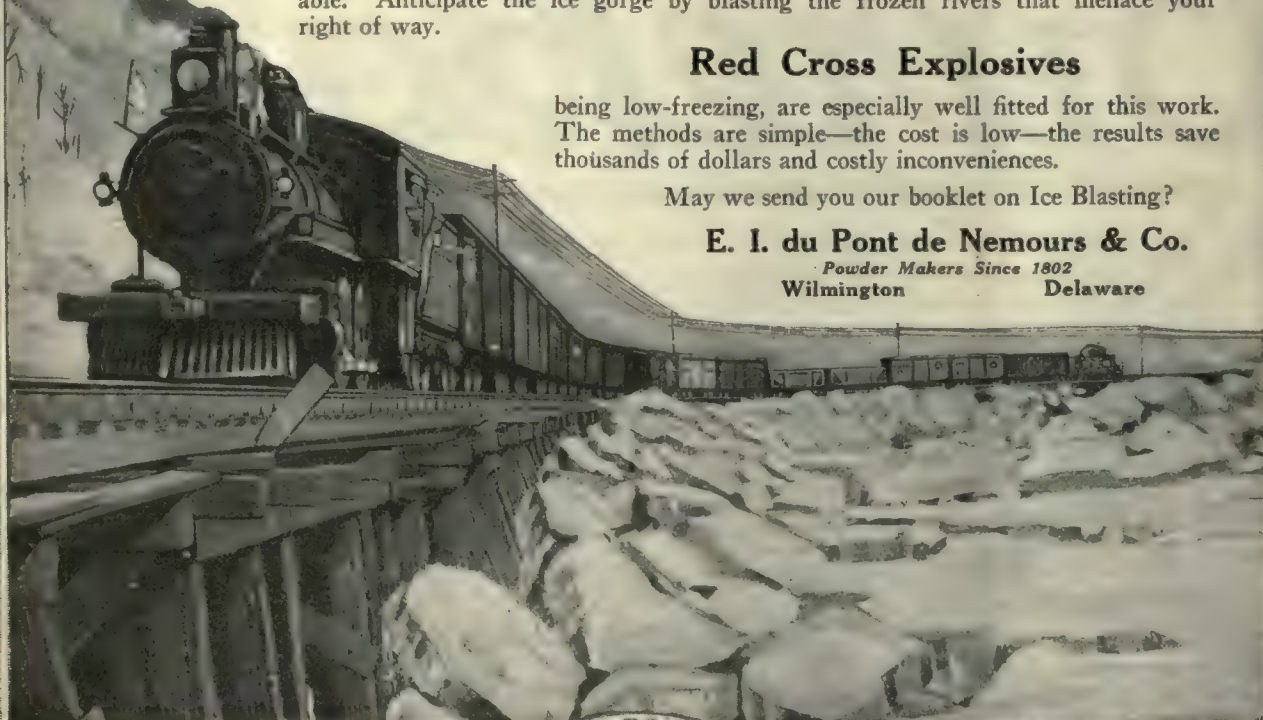
**Red Cross Explosives**

being low-freezing, are especially well fitted for this work. The methods are simple—the cost is low—the results save thousands of dollars and costly inconveniences.

May we send you our booklet on Ice Blasting?

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Powder Makers Since 1802  
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DU PONT

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Split  
Switches****Simple and  
Indestructible**

A safety necessity for street and interurban railways. Locks both right and left—no chance of a split switch—few parts—safe, dependable, simple in construction and easily installed. Fits any rail section. Used by many prominent roads. Send us a trial order and put them to the test.

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The heaviest traffic will not interfere with or damage the Weiss Switch Lock.

You can install one on approval, for 30 days' trial, but be sure to give measurements from top of rail to center of bolt holes.

**Watertight  
Non-Freezable  
Mud-Proof  
Sand-Proof**

**WEISS SWITCH LOCK CO., 600 E. Capitol Ave., Springfield, Ill.**



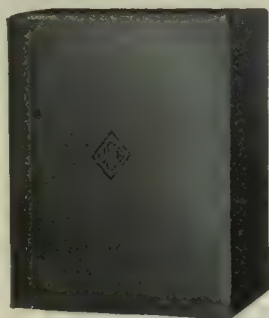
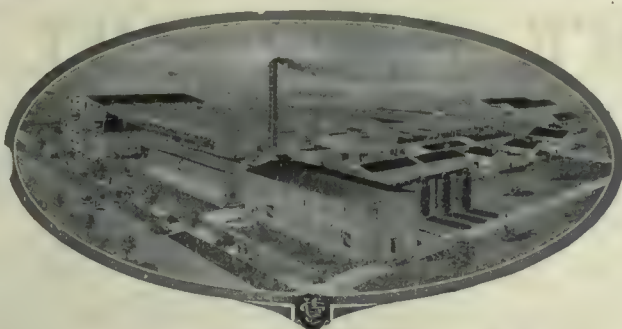


**Portable  
"PRUDENTIAL"  
STEEL BUILDINGS**

The ideal type for  
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Way Stations  
Booths of all kinds  
Offices—Depots

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To increase operating efficiency—for longer wear and greater mileage—specify U. S. G. Brushes.

We manufacture certain standard varieties of brushes, but our specialty lies in designing and manufacturing the type of brush to meet any given needs—YOUR needs.

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gives added life to your rails and car wheels and reduces labor costs (the big item) to a minimum. Put on the rails, it defies the weather and *stays* put.

To try it is to use it continually.

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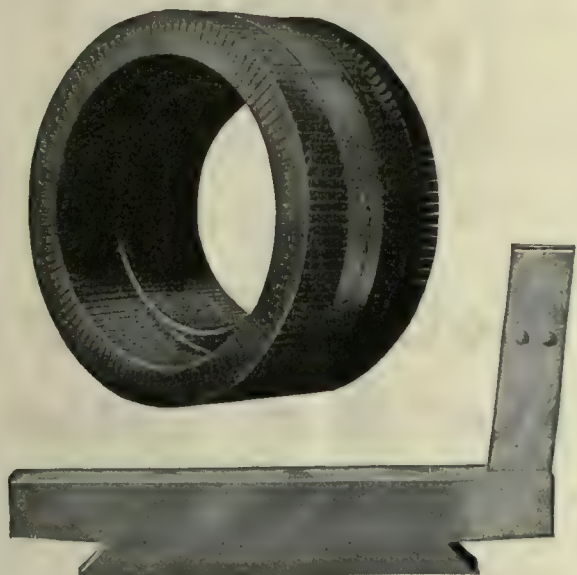
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# COMMUTATORS and SEGMENTS



## Cameron Commutators

The exceptionally sturdy design is the result of many years of specialization in better commutator building. After assembling they are made absolutely tight by hydraulic pressure. Guaranteed to be true to gauge and free from defects. No trouble from loose bars.

## Cameron Bars

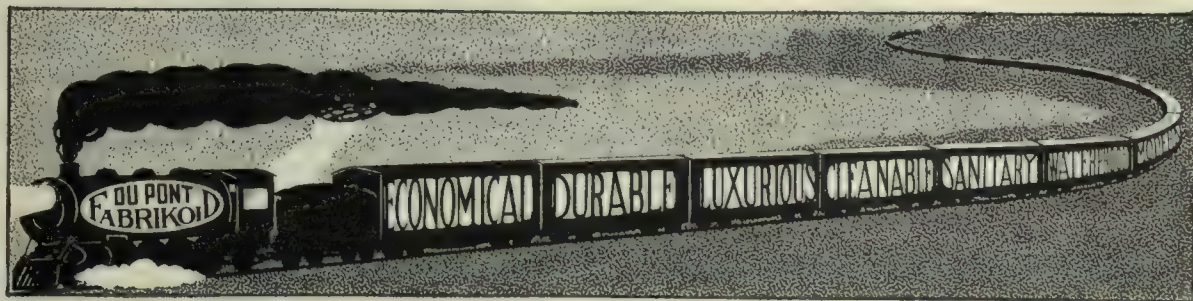
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Inserted lugs may be ordered, ready for armature lead connections.

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PARIS

**"LE CARBONE"**  
CARBON BRUSHES

# TRIUMPHANT

Over Maintenance Costs

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### "Le Carbone" Carbon Brushes

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Both solve electric railway problems.

The One-Man Car does the work of heavier, more expensive equipment on the road.

The "Star" Lathe does the work of heavier, more expensive equipment in the shops.

If quantity and quality of repair work count BUY "Star" Lathes. They will save—

- (1) Floor space
- (2) First cost
- (3) Repair work costs

Because the "Star" Lathe is built to increase the scope of the "small lathe," it is built with the highest accuracy and rigidity so that it can do work that formerly had to be handled on heavier lathes.

*Write us for details of the possibilities of the "Star" Lathe in your shops. Ask also for the new "Star" Lathe Catalog.*

—The—  
**Seneca Falls Mfg. Co., Inc.**  
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13-in. x 6-ft.  
Star Engine Lathe

"Star" Lathes are made in 9-in.,  
11 in., 12-in. and 13-in. swing.



The CLEVELAND Fare Box successfully handles the

## Zone System of Fares and Fare Collection Under the "Service at Cost" Plan

They accommodate any rate of fare, any kind of tickets and successfully meet all fare collection conditions. *Ask us for particulars.*

### The Cleveland Fare Box Co.

Cleveland, Ohio

Canadian Branch, Preston, Ont.

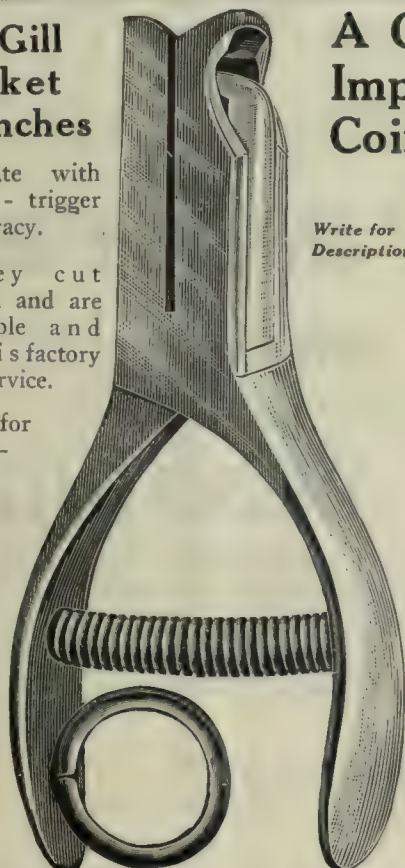


### McGill Ticket Punches

operate with hair-trigger accuracy.

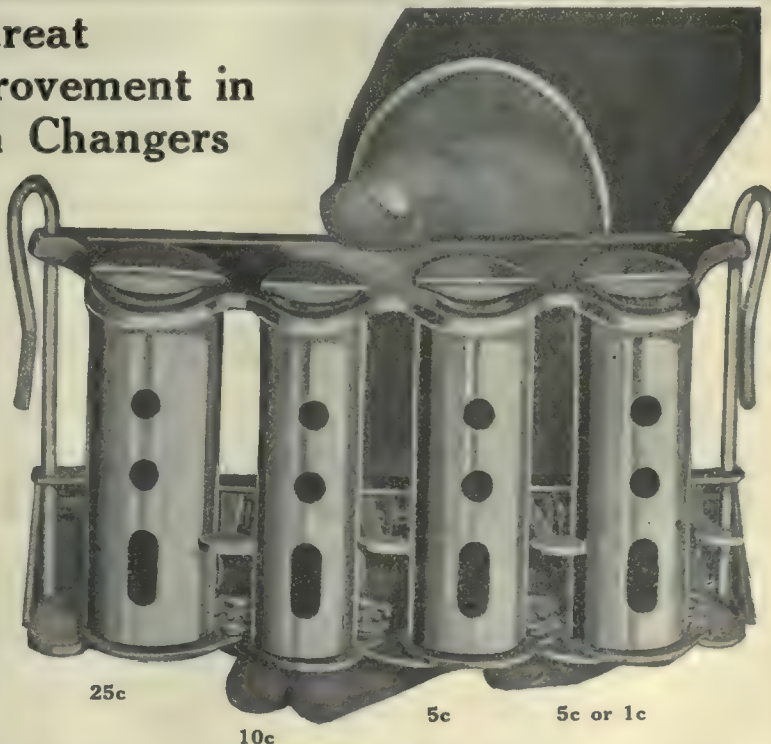
They cut clean and are durable and satisfactory in service.

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Write for Description.



The McGill HIGH-SPEED Lever-operated Changer is now built with a gear movement instead of a curved cam. If desired a fifth barrel can be attached, which will meet all practical requirements of fare collections. The new machine can be supplied to eject quarters, dimes, nickels, single pennies, or 4 or 5 pennies at one time. Also 4 nickels at a time; also metal checks for fare box service.

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Try out these Catchers and Retrievers—

And you will do as other railways have done

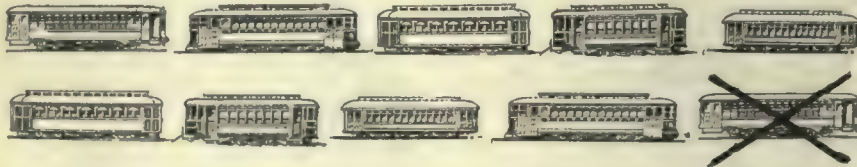
## Made by

*the only concern in America making trolley Retrievers and Catchers exclusively.*

*That means good craftsmanship.*

You will *standardize on them*. Roads that were fully equipped with *other makes* have had this experience. We will be glad to help you in the vital matter of cutting costs and rendering *better service*, by sending you samples upon receipt of data regarding your equipment, speed, trolley tension, etc.

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*Take off one car—and still get the same car mileage!—*

*with*

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This saving of 9 per cent. in running time is almost the equivalent of 9 cars for 10 for the same car mileage!

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The Ideal  
Armature Metal

It will pay you  
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and unnecessary if you will order your requirements before your stock is exhausted.

Make due allowance for prevailing conditions affecting manufacture and delivery.

We have sufficient stock of raw materials to take care of orders booked, as well as your requirements for three months commencing shipment 8 to 10 weeks from receipt of order.

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*Know them—  
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Sales Offices in All Principal Cities

## **FMB** Grid Resistors

**ARE MADE RIGHT AND STAY RIGHT**

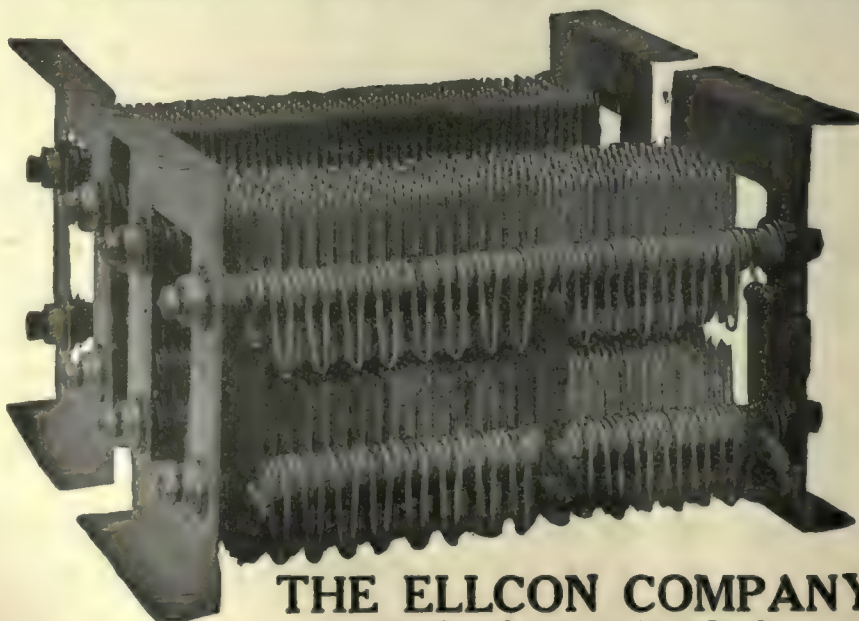
No resistors get more abuse than those under a car.

They are abused electrically by careless operation of the controller.

They are abused mechanically by exposure to dusty, muddy and stone-littered streets.

Until the arrival of E M B drawn, non-corroding grid resistors, troubles from these sources seemed unavoidable.

E M B grid resistors actually have made this part of your equipment troubleproof.



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### Nachod Signals

No matter what your road conditions are, a Nachod will take care of them. There are 7 types of Nachods for all service, from high speed interurban to city travel.

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*Nachod Spells Safety*

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 PACIFIC COAST REPRESENTATIVES  
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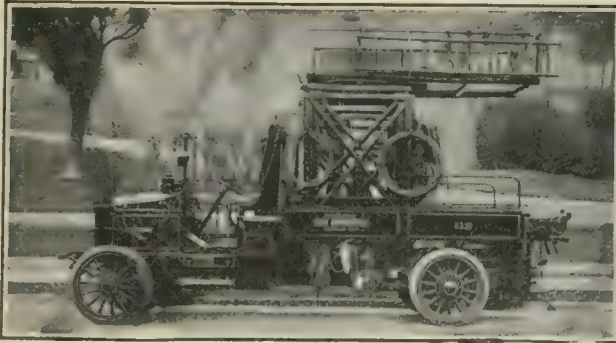
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The top section is reinforced by the intermediate section. The 3-section design makes it possible to raise the platform 16 inches higher and drop it 12 inches lower than can be done with the old-style 2-section tower.

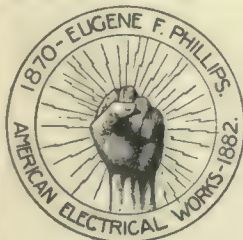
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CORRUGATED CULVERTS**

An unsanitary open ditch in a Western City was walled with concrete and covered with upper sections of "ACME" culvert as shown above.

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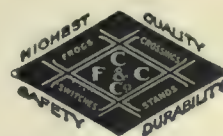
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**HIGHEST QUALITY**

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SWITCHES, FROGS AND CROSSINGS.  
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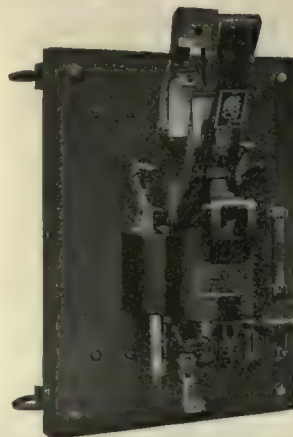
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Woven tape is too expensive.  
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the temper. "Fastej" satisfies in  
price and in service.

The edge can't unravel.

Sold in rolls of 72 yds. and from  
1 in. upward. Immediate delivery.  
May we have your order?



**Freydberg Bros., Inc.**

51 West 18th Street

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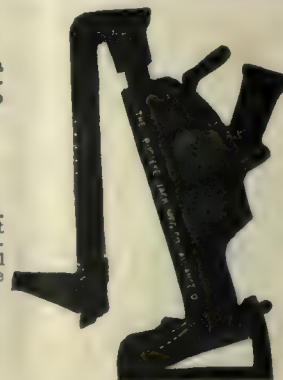
## Full power with High or Lower Adjustment

Many emergencies requiring a  
powerful jack present a diffi-  
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bear on the load. The

## Buckeye Emergency Jack No. 239 Special

saves time, strength and trouble.  
The many positions to which it  
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details in our catalog. Write  
for it.

**The Buckeye  
Jack Mfg. Co.**  
Alliance, Ohio







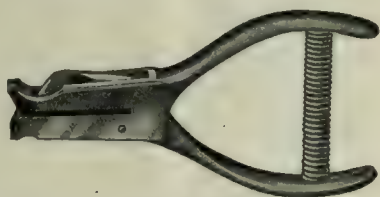
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STANDARD REGISTER COMPANY  
DAYTON, OHIO

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NEW HAVEN, CONN.

Reproduction  
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in Service for  
Fifteen Years

This Car Brass was  
sent to us by a large  
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We do not guarantee all our Car Brasses to wear as long—but  
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They are metals that give good service.

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MASON SAFETY TREAD—Lead or carborundum filled; non-slippery;  
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Tulsa, Okla., Jan. 10, 1919.

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The efficiency of these heaters was thoroughly  
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ing of 50% or more fuel.

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them very comfortable with a small amount of  
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Very truly yours,

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(Signed) H. T. Morrison, Gen. Mgr., Operation

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have always been made of en-  
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EXCLUSIVE TROLLEY WHEEL  
MAKERS IN THE WORLD.



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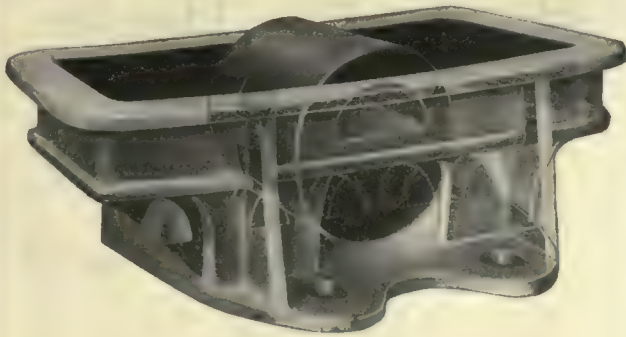
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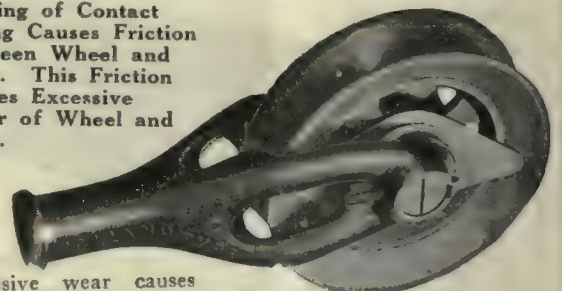
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Spring Causes Friction  
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Excessive wear causes  
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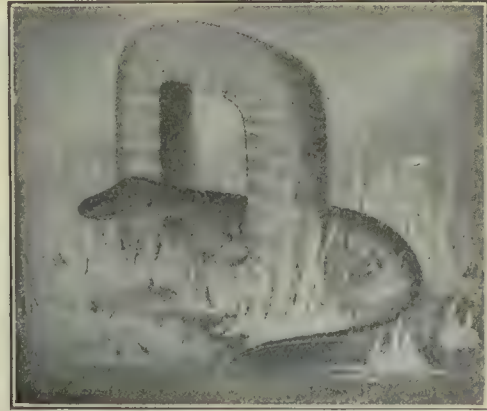
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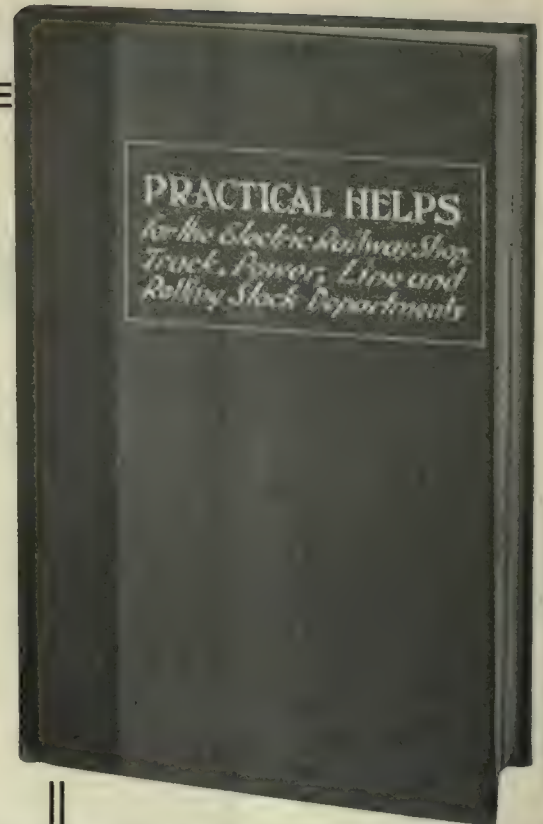
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**EXPERIENCED** instructor wanted for city and interurban motormen on road located in Middle West operating 200 cars and 8 electric locomotives with automatic air and type M and HL control. State age, experience and salary expected. P-357, Elec. Ry. Journal, Chicago.

**HIGH-GRADE** master mechanic wanted for street railway system in Texas city of 25,000. P-342, Elec. Ry. Journal, Chicago.

**MAN** wanted, experienced in electric railway track work, as shop inspector for frog and switch manufacturer; also draftsman who has had experience in designing manganese special track work. State salary and experience in first letter. P-361, Elec. Ry. Journal, Chicago.

**NAMES** and addresses wanted of competent English-Spanish translators in various localities east of Chicago who can work part time. P-369, Elec. Ry. Journal.

**ONE** armature winder wanted. Tulsa Street Railway Co., Tulsa, Oklahoma.

### POSITIONS WANTED

**CHIEF** engineer or engineer maintenance of way. 12 years' experience maintenance, construction and operation. Accurate knowledge of all matters related to way and structure department. Technically trained. References. PW-367, Elec. Ry. Journal, Chicago.

**CITY** superintendent, now employed, for a large interurban and street railway company wants to make a change. Have had 18 years' experience as conductor, motorman, cashier, freight agent; 13 years as superintendent of both interurban and city lines. Can furnish good references. If you need a man who has learned his work through hard work in the ranks, send full details of property and salary paid. PW-370, Elec. Ry. Journal, Chicago.

**ELECTRICIAN**, age 35, technical graduate, desires responsible position with opportunities for advancement. 13 years' experience includes interior wiring, maintenance and operation of large power and rotary converter substations. Available now, location immaterial, least salary \$1800. PW-303, Elec. Ry. Journal.

**ENGINEER**—Railway specialist can be engaged as maintenance of way engineer. Ten years' experience, track, roadway and overhead construction and maintenance; valuation, also public service reports. Technical graduate, at present employed as engineer. M. of W. PW-360, Elec. Ry. Journal.

**GAS**, electric and railway manager having 18 years' practical experience desires to locate. Present employed and can furnish the best of references from present and past employers. PW-368, Elec. Ry. Journal, Chicago.

**MARRIED** man, 9 years experience in claim department of large city and interurban company, wishes to make change. Seeks position as chief or assistant chief claim agent. PW-358, Elec. Ry. Journal, Leader-News Bldg., Cleveland.

**MARRIED** man wants situation as master mechanic. 14 years' experience. Would accept situation in either eastern or western states. References. Address PW-365, Elec. Ry. Journal.

**OVERHEAD** man with 17 years' experience on construction and maintenance of City and Interurban lines, wishes position as superintendent or general foreman. Successful in organizing and handling men. PW-364, Elec. Ry. Journal, Philadelphia.

**POSITION** as sales manager wanted for producing company handling anthracite middle states and Canada; 25 years' experience in shipping to these points. P. O. Box 173, Elmira, N. Y.

### POSITIONS WANTED

**POSITION** wanted. Man, 42 years of age, with 18 years of street and interurban railway experience as trainman, train dispatcher, and as an official for several years. Now employed, but desirous of making a change by May 1st. Western states preferred. Address PW-366, Elec. Ry. Journal, Leader-News Bldg., Cleveland.

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- 6—Gasoline Passenger Cars.
- 50—Freight Cars.
- 12—Electric Sets.

Get our Lists and Prices  
J. F. DONAHOO CO. Birmingham, Ala.

## Street Car Plant For Sale

The Master Commissioner of the Circuit Court will on

**Monday, April 7, 1919**

at Bowling Green, Ky., offer at public auction to realize \$21,000 the entire plant and franchises of the Southern Traction Company consisting of 4½ miles 60 T rail track, 6 cars and all equipments and real and personal property. Terms of sale 6 months.

## RAILS

**15,000 TONS—NEW and RELAYERS**  
NEW—12 lb., 16 lb., 20 lb., 25 lb., 30 lb., 40 lb., 60 lb., 70 lb., 75 lb., 80 lb., 85 lb., 90 lb.  
RELAYERS—30 lb., 35 lb., 40 lb., 45 lb., 50 lb., 60 lb., 70 lb., 80 lb., 85 lb., 90 lb., 100 lb.

Fas alongs, New Bolts, Nuts and Spikes. New Frogs, Switches, Crossings and all accessories. Carload and less carload inquiries and orders a specialty. Rails cut to lengths for structural purposes. Attractive prices. Immediate shipments from stock.

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### FOR QUICK SALE

8—Closed, 31-Ft.

### MOTOR CARS

Length of body 22 ft. 9 in. Longitudinal seats. Mounted on Brill 21-E single trucks, wheel base 7 ft. 6 in. Westinghouse No. 38 motors. Excellent condition.

Price reasonable.

The Northern Ohio Traction & Light Co.  
Akron, Ohio

**Cars, Rails, Locomotives,  
Cranes, Generators, Turbines,  
Motors, Machine Tools,  
Hammers, Presses**

Everything For  
**POWER, RAILROADS, INDUSTRY,  
CONTRACTORS**

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**RAILWAY & POWER EQUIPMENT CO.**  
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1—Western Electric Direct Connected

## MOTOR GENERATOR SET

Motor—510-525 volts, 515 ampere, 500 r.p.m. Generator—46-115 volts, 2300 amp., 500 r.p.m.

Complete with two switchboard panels, ammeter and rheostats.

E. E. KRETSCHMER, Pur. Agt.  
The Metropolitan W. S. Elev. Ry. Co.  
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### 1000 TONS

## NEW 7 in. HIGH TEE RAIL

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Co's Section 91-375.

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Apply F. S. 369, Electric Railway Journal  
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Note:—We are compiling an extensive list of machinery, electrical apparatus, mechanical supplies, tools and structural material of all kinds which we have for sale. If you desire to receive this list, when printed, please file with us your name and address.

## Du Pont Chemical Company

Incorporated

Sales Department

Wilmington, Delaware

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- 1—300-kw. Westinghouse Rotary Converter, 3-ph., 60-cy., 370-v. A.C., 575-v. D.C., 600 r.p.m.
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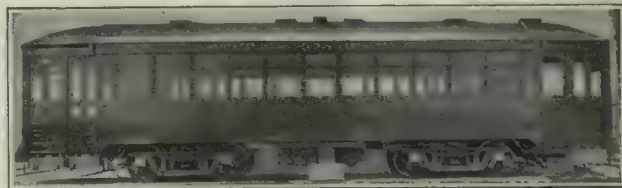
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Five new P.A.Y.E. double truck cars. Length, 45-ft. Equipped with 4GE Co.'s 247 Motors and G. E. Co. Air Brakes.

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- 2—360 hp. Erie City, 160 lb. pressure.
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- 6—308 hp. Heine, 140 lb. pressure.
- 1—305 hp. Babcock & Wilcox, 160 lb. pressure.
- 12—264 hp. Babcock & Wilcox, 175 lb. pressure.
- 8—250 hp. Stirling, 160 lb. pressure.
- 1—212 hp. Babcock & Wilcox, 160 lb. pressure.
- 2—204 hp. Babcock & Wilcox, 160 lb. pressure.

### MacGovern & Company, Inc.

114 Liberty St., New York, N. Y.  
Pittsburgh Office: 498 Union Arcade Bldg.

## Some One Wants to Buy

the equipment or machinery  
that you are not now using.

This may be occupying valuable space, collecting dust, rust and hard knocks in your shops and yards.

**Sell it Before depreciation Scraps it.**

*The Searchlight Section is helping others  
—let it help you also.*





Exterior View



Exterior View



Interior View

## United States Shipping Board Emergency Fleet



Interior View

**BIDS**—For the purchase, f.o.b. cars Philadelphia, of any number of cars up to and including six, will be received by J. W. Smith, Manager Passenger Transportation and Housing Division, United States Shipping Board Emergency Fleet Corporation, No. 140 North Broad Street, Philadelphia.

**Delivery**—Immediate.

**Terms**—25 per cent. sight draft. Balance to be arranged.

**General**—Cars and equipment are entirely new, are open to inspection on request at the works of the manufacturer, the J. G. Brill Company, and cost, as is, \$13,570 each.

### SPECIFICATIONS BODY

Length over anti-climbers.....	45 ft. 6 in.
Length over corner posts.....	33 ft. 0 in.
Length over vestibules.....	44 ft. 2 in.
Extreme width.....	8 ft. 6 in.
Height from rail over trolley board.....	11 ft. 8 in.
Truck centers.....	21 ft. 0 in.
Radius of shortest curve.....	35 ft.
Seating capacity.....	50
Sheathing (sheet steel).....	3/32 in.
Doors, Hand operated	
Headlight, Crouse Hinds "Imperial"	
Registers, International R-7	
Fare Boxes, International G-15	
Heater, 1—Peter Smith Hot Air	
Hand Brakes, National	

### AIR EQUIPMENT

G. E. Straight-Air Compressor C.P.-27

### TRUCKS

Brill 77 E-1	Wheel Base, 5 ft. 9 in.
Diameter of Wheel.....	33 in.
Tread.....	3 in.
Flange.....	$3 \times \frac{7}{8}$ in.
Axle in Motor Bearing.....	4 $\frac{1}{2}$ in.
Axle in Gear Seat.....	5 in.
Gauge of Track.....	4 ft. 8 $\frac{1}{2}$ in.

### MOTOR EQUIPMENT

4—Westinghouse 514 A-600-volt, 40-hp. Motors, double end K-35 G-2 control.

Solid Gears—58 teeth Pinions—15 teeth

### PERFORMANCE

The free running speed on tangent level track and 525-volt will be 30-31 m.p.h. with car carrying 50 passengers.

### WEIGHT

Light, 42240

With 50 passengers, 49,740

**BIDS**—For the purchase, f.o.b. cars, Philadelphia, of one snow plow will be received by J. W. Smith, Manager, Division of Passenger Transportation and Housing, United States Shipping Board Emergency Fleet Corporation, 140 North Broad Street, Philadelphia.

**Delivery**—Immediate.

**Terms**—25 per cent. sight draft, balance to be arranged.

**General**—The plow and equipment is entirely new, is open to inspection on request, at the works of the manufacturer, the J. G. Brill Company, Philadelphia, and cost, as is, \$13,134.

### SPECIFICATIONS

Length over all.....	41 ft. 4 in.
Length over end body sheathing.....	31 ft. 6 $\frac{1}{2}$ in.
Length of body inside.....	30 ft. 9 in.
Width over side body sheathing.....	7 ft. 6 in.
Width over body inside.....	6 ft. 8 $\frac{1}{2}$ in.
Width over all wings closed not to exceed.....	8 ft. 10 in.
Width over all wings open.....	12 ft. 9 in.
Height from bottom of sill to top roof.....	8 ft. 0 in.
Height from top of rail to bottom sill.....	2 ft. 6 $\frac{1}{2}$ in.
Height of body inside—clear.....	6 ft. 4 in.
Height from top of rail to top of trolley stand.....	10 ft. 9 $\frac{1}{2}$ in.
Height of share blades.....	5 ft. 0 in.

### DIMENSIONS OF MAIN TIMBERS

Side sills.....	4 $\frac{1}{2}$ x 11 $\frac{1}{2}$ in.
Intermediate sills.....	5 x 3 in.
Cross timbers.....	4 x 7 in.
Side posts.....	2 $\frac{1}{2}$ x 4 in.
Side posts at truss.....	2 $\frac{1}{2}$ x 5 in.
Flooring, single.....	1 $\frac{1}{2}$ in.
Lift of plow share.....	6 in.
Lift of digger.....	3 in.
Gauge.....	4 ft. 8 $\frac{1}{2}$ in.
To operate on curve of.....	35 ft. radius

**AXLE**—Open hearth steel, 4  $\frac{1}{2}$  x 8-in. journal, 5  $\frac{1}{8}$ -in. wheel fit, 5  $\frac{1}{2}$ -in. gear fit, 5-in. dia. motor fit.

**AIR BRAKES**—Westinghouse Traction Brake Co.'s schedule A M M automatic with graduated release and emergency straight air feature.

1—D-2 E G 25-ft. compressor.

1—Brake cylinder, 10 x 12 in.

2—Main reservoirs, 16 x 42 in.

**DIGGER**—Double truck standard, four per plow, arranged to operate from both ends of plow.

**DRAW BARS**—Special, radial M.C.B. applied as per B/P 6952, to couple with Tomlinson and spring carrier.

**MOTOR EQUIPMENT**—4—Gen. Elect. 201-G, 65-hp.

2—K-35 G-2 controllers and equipment.

71-tooth solid gears.

15-tooth pinions.

**SPREADERS**—12 ft. 0 in. long, furnished by Car Builder.

**SIDES**—4-in. sheathing.

**TRUCKS**—Brill standard 53-F for 8-wheel plow—4 diggers.

**TRUCK CENTERS**—14 ft. 0 in.

**TRUCK WHEEL BASE**—4 ft. 0 in.

**SHARE LIFTING DEVICE**—Standard pneumatic (air). We furnish

and apply 2—8-in. cylinders, 2— $\frac{1}{2}$ -in. engineers valves complete and

1—engineer's handle.

**WHEELS**—33-in. cast iron, 3-in. tread,  $\frac{1}{2}$ -in. flange.

**NOTICE**—Apparatus to be located that motormen will be in R. H.

corner and can look out of window.

**WEIGHT**—Complete weight, 56,920 lb.



# WHAT AND WHERE TO BUY

Equipment, Apparatus and Supplies Used by the Electric Railway Industry with  
Names of Manufacturers and Distributors Advertising in this Issue

**Advertising, Street Car**  
Collier, Inc., Barron G.

**Air Pressure Relays**  
Philadelphia Electric Company  
Supply Dept.

**Air Rectifiers**  
Holden & White, Inc.

**Amusement Devices**  
Este Co., The J. D.

**Anchor, Guy**  
Electric Service Supplies Co.  
Holden & White, Inc.  
Ohio Brass Co.  
Western Electric Co.  
Westinghouse Elec. & M. Co.

**Anti-Climbers**  
Railway Improvement Co.

**Armature Shafts**  
Laclede Steel Co.

**Ash Storage Tanks, Cast Iron**  
Green Engineering Company

**Automobiles and Buses**  
Brill Co., The J. G.

**Axle Straighteners**  
Columbia M. W. & M. I. Co.

**Axles, Car Wheel**  
Bemis Car Truck Co.  
Brill Co., The J. G.  
Cambria Steel Co.  
Carnegie Steel Co.  
General Steel Co.  
Laclede Steel Co.  
Midvale Steel & Ordnance Co.  
National Railway Appliance Co.  
St. Louis Car Co.  
Standard Steel Works Co.  
Taylor Elec. Truck Co.  
Westinghouse Elec. & M. Co.

**Rabbiting Devices**  
Columbia M. W. & M. I. Co.

**Rabbit Metal**  
Ajax Metal Co.

**Badges and Buttons**  
Electric Service Supplies Co.  
International Register Co., The  
Western Electric Co.

**Batteries, Dry**  
Nichols-Lintern Co.  
Western Electric Co.

**Batteries, Storage**  
Electric Storage Battery Co.  
Western Electric Co.

**Bearings and Bearing Metals**  
Ajax Metal Co.  
Bemis Car Truck Co.  
Clark Elec. & Mfg. Co.  
Columbia M. W. & M. I. Co.  
Cosmic Metal Co.  
Eureka Co.  
General Electric Co.  
Kerschner Co., Inc., W. R.  
More-Jones Brass & Metal Co.  
Post & Co., E. L.  
St. Louis Car Co.  
Taylor Elec. Truck Co.  
Westinghouse Elec. & M. Co.

**Bearings, Center and Roller Side**  
Holden & White, Inc.  
Stucki Co., A.

**Bearings, Roller and Ball**  
Gurney Ball Bearing Co.  
Railway Roller Bearing Co.

**Bearings, Oilless, Graphite, Bronze  
and Wood**  
Bound Brook Oil-less Bearing Co.

**Bells and Gongs**  
Brill Co., The J. G.  
Columbia M. W. & M. I. Co.  
Electric Service Supplies Co.  
St. Louis Car Co.  
Western Electric Co.

**Benders, Rail**  
Niles-Bement-Pond Co.  
Reading Specialties Co.  
Western Electric Co.  
Wharton, Jr. & Co., Wm.  
Zelnicker, Walter A., Supply Co.,  
Inc.

**Blasting Powder and Equipment**  
Du Pont de Nemours & Co., E. I.

**Boilers**  
Babcock & Wilcox Co.

**Boiler Tubes**  
National Tube Co.

**Book Publishers**  
McGraw-Hill Book Co.

**Bond Testers**  
American Steel & Wire Co.  
Lincoln Bonding Co.  
Roller Smith Co.

**Bonding Apparatus**  
American Steel & Wire Co.  
Electric Railway Improvement Co.  
Electric Service Supplies Co.  
Lincoln Bonding Co.  
Ohio Brass Co.

**Bonds, Rail**  
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Electric Railway Improvement Co.  
Electric Service Supplies Co.  
General Electric Co.  
Lincoln Bonding Co.  
Ohio Brass Co.  
Westinghouse Elec. & M. Co.

**Boring Tools, Car Wheel**  
Niles-Bement-Pond Co.

**Brackets and Cross Arms (See also  
Poles, Ties, Posts, Etc.)**  
American Bridge Co.  
Bates Expanded Steel Truss Co.  
Electric Railway Equipment Co.  
Hubbard & Co.  
Lindsay Bros. Co.  
Ohio Brass Co.  
Western Electric Co.

**Brake Adjusters**  
Holden & White, Inc.  
Smith-Ward Brake Co.  
Westinghouse Traction Brake Co.

**Brake Shoes**  
Amer. Brake Shoe & Fdry. Co.  
Barbour-Stockwell Co.  
Brill Co., The J. G.  
Columbia M. W. & M. I. Co.  
St. Louis Car Co.  
Taylor Elec. Truck Co.

**Brakes, Brake Systems and Brake  
Parts**  
Allis-Chalmers Mfg. Co.  
Bemis Car Truck Co.  
Brill Co., The J. G.  
Columbia M. W. & M. I. Co.  
General Electric Co.  
Holden & White, Inc.  
National Brake Co.  
St. Louis Car Co.  
Safety Car Devices Co.  
Taylor Elec. Truck Co.  
Westinghouse Trac. B. Co.

**Brick, Fire**  
Green Engineering Co.

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American Bridge Co.

**Brooms, Truck, Steel or Batten**  
Paxson Co., J. W.  
Western Electric Co.  
Zelnicker, Walter A., Supply Co.,  
Inc.

**Brushes, Carbon**  
General Electric Co.  
Jandron, W. J.  
Morsan Crucible Co.  
National Carbon Co.  
United States Graphite Co.  
Western Electric Co.  
Westinghouse Elec. & M. Co.

**Brushes, Graphite**  
United States Graphite Co.

**Brush Holders**  
Anderson Mfg. Co., A. & J. M.

**Columbia M. W. & M. I. Co.**  
Eureka Co.

**Buckets**  
Blaw-Knox Company

**Buildings, Portable**  
Pruden Co., C. D.

**Bumping Post**  
Mechanical Mfg. Co.

**Bunkers, Coal**  
American Bridge Co.

**Bushings, Case Hardened & Man-  
ganese**  
Bemis Car Truck Co.

**Bushings, Graphite and Wooden**  
Bound Brook Oil-less Bearing Co.

**Cables. (See Wires and Cables.)**

**Cable End Bells**  
Philadelphia Electric Company  
Supply Dept.

**Carbon Brushes. (See Brushes,  
Carbon.)**

**Car Equipment. (For Fenders,  
Heaters, Registers, Wheels,  
etc.—See those headings.)**

**Car Trimmings. (For Curtains,  
Registers, Doors, Seats, etc.—  
See those headings.)**

**Car Panel Safety Switches**  
Westinghouse Elec. & Mfg. Co.

**Cars, Dump**  
Differential Car Co.

**Cars, Passenger, Freight, Express,  
etc.**  
American Car Co.  
Brill Co., The J. G.  
Cambria Steel Co.  
Kuhman Car Co., G. O.  
McGuire-Cummings Mfg. Co.  
Midvale Steel & Ordnance Co.  
National Safety Car & Equip-  
ment Co.  
St. Louis Car Co.  
Wason Mfg. Co.

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Electric Equipment Co.  
Kerschner Co., Inc., W. R.

**Cars, Section**  
Mudge & Co.

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General Electric Co.

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More-Jones Brass & Metal Co.

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American Steel Foundries.  
Bemis Car Truck Co.  
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St. Louis Car Co.  
Standard Steel Works Co.  
Wharton, Jr. Co., Wm.

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Bemis Car Truck Co.  
Columbia M. W. & M. I. Co.  
St. Louis Car Co.

**Catchers and Retrievers, Trolley**  
Earl, C. I.  
Electric Service Supplies Co.  
Holdep & White, Inc.  
Kerschner Co., Inc., W. R.  
Ohio Brass Co.  
Wood Co., Chas. N.

**Ceilings, Car**  
Keyes Products Co.  
Pantaote Co.

**Change Carriers**  
McGill Ticket Punch Co.

**Circuit Breakers**  
Automatic Reclosing Circuit  
Breaker Co.  
The Cutter Electrical & Mfg. Co.  
General Electric Co.  
Western Electric Co.  
Westinghouse Elec. & Mfg. Co.

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and Cables**  
Anderson Mfg. Co., A. & J. M.  
Dossert & Co.  
Electric Railway Equipment Co.  
Electric Service Supplies Co.  
General Electric Co.  
Hubbard & Co.  
Klein & Sons, Mathias  
Ohio Brass Co.  
Western Electric Co.  
Westinghouse Elec. & Mfg. Co.

**Clamps, Insulator**  
Philadelphia Electric Company  
Supply Dept.

**Cleaners and Scrapers Track—(See  
also Snow-Flows, Sweepers and  
Brooms.)**  
Brill Co., The J. G.  
Ohio Brass Co.  
Van Dorn & Dutton Co.  
Western Electric Co.

**Cleat Type Switchboard Insulators**  
Philadelphia Electric Company  
Supply Dept.

**Clusters and Sockets**  
General Electric Co.

**Coal and Ash Handling—(See Con-  
veying and Hoisting Machin-  
ery.)**

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Railway Improvement Co.

**Coil Banding and Winding Ma-  
chines**  
Columbia M. W. & M. I. Co.  
Electric Service Supplies Co.  
Western Electric Co.

**Coils, Armature and Field**  
Cleveland Armature Works.  
Columbia M. W. & M. I. Co.  
D & W Fuse Co.  
General Electric Co.  
Independent Lamp & Wire Co.  
Rome Wire Co.  
Westinghouse Elec. & M. Co.

**Coils, Choke and Kicking**  
Electric Service Supplies Co.  
General Electric Co.  
Westinghouse Elec. & M. Co.

**Coin-Counting Machines**  
International Register Co., The  
Johnson Fare Box Co.

**Commutator Slotters**  
Electric Service Supplies Co.  
General Electric Co.  
Westinghouse Elec. & Mfg. Co.  
Wood Co., Chas. N.

**Commutator Truing Devices**  
General Electric Co.

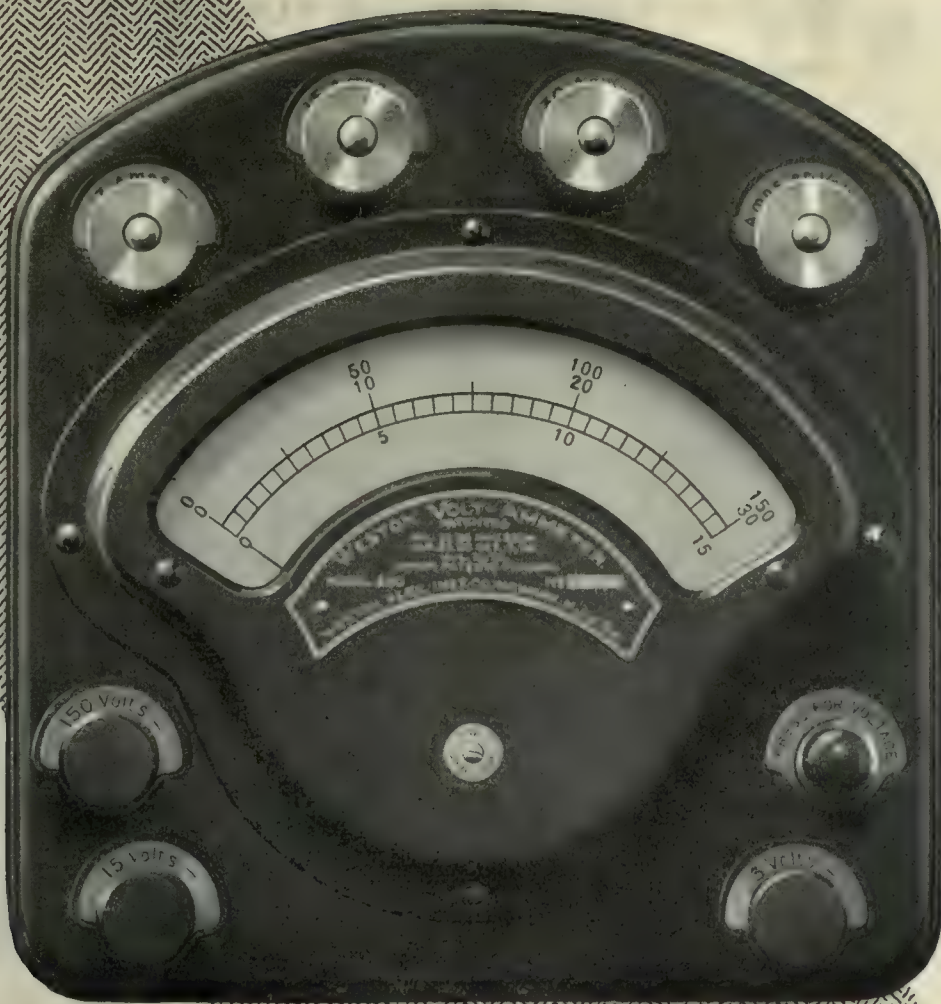
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Cameron Electrical Mfg. Co.  
Cleveland Armature Works.  
Columbia M. W. & M. I. Co.  
Eureka Co.  
General Electric Co.  
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Portable Machinery Co.**Conveyors, Portable**  
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International Register Co., The  
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Electric Service Supplies Co.  
Samson Cordage Works.  
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Thew Automatic Shovel Co.  
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International Steel Tie Co.**Crossing Signals. (See Signals, Crossing)****Crossings, Track. (See Track, Special Work)****Culverts**  
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Pantasote Co.  
St. Louis Car Co.**Cutting Apparatus Oxy-Acetylene**  
Milburn Co., The Alex.**WHAT AND WHERE TO BUY****Dealers' Machinery**  
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Electric Equipment Co.  
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Griewold Machine Co., Geo. M.  
Hyman Michaels Co.  
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Walter A.**Derailing Devices. (See also Track Work)**  
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National Pneumatic Co., Inc.  
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General Electric Co.  
Hale & Kilburn Corp.**Doors, Folding Vestibule**  
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Chicago Pneumatic Tool Co.  
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Keith, Herbert C.  
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Seaford Engineering Co.  
Stone & Webster.  
U. G. I. Contracting Co.  
White Companies, The J. G.  
Wells, Gardner F.  
Woodmansee & Davidson Engineering Co.**Engines, Gas and Oil**  
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Westinghouse Elec. & Mfg. Co.**Engines, Steam**  
Allis Chalmers Mfg. Co.  
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Cleveland Fare Box Co.  
International Register Co., The  
Johnson Fare Box Co.  
National Railway Appliance Co.  
Ohmer Fare Register Co.**Fences, Woven Wire and Fence Posts**  
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Page Steel & Wire Co.**Fenders and Wheel Guards**  
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Scaife & Sons Co., Wm. B.**Floodlights**  
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American Mason Safety Tread Co.  
Western Electric Co.**Forgings**  
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Western Electric Co.  
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General Electric Co.**Galvanizing**  
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Thayer & Co., Inc.  
Westinghouse Elec. & Mfg. Co.**Gears and Pinions**  
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Kerschner Co., Inc., W. R.  
National Railway Appliance Co.  
Nuttall Co., R. D.  
Poole Eng. & Machine Co.  
Tool Steel Gear & Pinion Co.  
Van Dorn & Dutton Co.**Gears, Reduction**  
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Westinghouse Elec. & Mfg. Co.**Goggles, Safety**  
Standard Optical Co.**Gongs. (See Bells and Gongs)****Graphite**  
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Metal & Thermit Corp.  
Railway Track-work Co.  
Western Electric Co.**Grinding Blocks and Wheels**  
Railway Track-work Co.**Grounding Boxes**  
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Cooper Heater Co.  
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Zelnicker Supply Company, Inc.  
Walter A.

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Railway Roller Bearing Co.

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General Electric Co.  
Westinghouse Elec. & Mfg. Co.

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General Electric Co.  
Western Electric Co.  
Westinghouse Elec. & Mfg. Co.

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Ohio Brass Co.

#### Lathes

Seneca Falls Mfg. Co.

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Williams & Co., J. H.

#### Lathes, Car Wheel

Niles-Bement-Pond Co.

#### Lights, Portable Electric

Milburn Co., The Alex.

#### Lighting Regulators, Car

Holden & White, Inc.

#### Lightning Protection

Anderson M. Co., A. & J. M.  
Electric Service Supplies Co.  
General Electric Co.  
Ohio Brass Co.  
Western Electric Co.  
Westinghouse Elec. & Mfg. Co.

#### Line Material. (See also Brackets, Insulators, Wires, etc.)

Anderson M. Co., A. & J. M.  
Columbia M. W. & M. I. Co.  
Dossert & Co.  
Drew Electric & Mfg. Co.  
Electric Railway Equipment Co.  
Electric Service Supplies Co.  
Eureka Co.  
General Electric Co.  
Holden & White, Inc.  
Hubbard & Co.  
Locke Insulator Co.  
More-Jones B. & M. Co.  
Ohio Brass Co.  
Western Electric Co.  
Westinghouse Elec. & Mfg. Co.  
White Electrical Supply Co.

## WHAT AND WHERE TO BUY

**Locomotives, Electric**  
Brill Co., The J. G.  
General Electric Co.  
McGuire-Cummings Mfg. Co.  
Westinghouse Elec. & Mfg. Co.

**Lubricating Engineers**  
Galena-Signal Oil Co.

**Lubricants, Oil and Grease**  
Galena-Signal Oil Co.

**Lumber. (See Poles, Ties, etc.)**

**Machine Tools**  
Columbia M. W. & M. I. Co.

**Machine Work**  
Columbia M. W. & M. I. Co.  
Holden & White, Inc.

**Metal Tickets**  
Scovill Mfg. Co.

**Meters, Car, Watt-Hour**  
Economy Electric Devices Co.

**Meters. (See Instruments)**  
Electric Service Supplies Co.  
Wood Co., Chas. N.

**Mica**  
Mica Insulator Co.  
Schoonmaker Co., A. O.

**Mirrors for Motormen**  
Drew Elec. & Mfg. Co.

**Motors, Electric**  
Allis Chalmers Mfg. Co.  
Western Electric Co.  
Westinghouse Elec. & Mfg. Co.

**Motor Leads**  
Dossert & Co.

**Motor Generation, Bonding and Welding**  
Lincoln Bonding Co.

**Nuts and Bolts**  
Allis Chalmers Mfg. Co.  
Barbour-Stockwell Co.  
Bemis Car Truck Co.  
Columbia M. W. & M. I. Co.  
Hubbard & Co.  
Lackawanna Steel Co.

**Oils. (See Lubricants)**

**Oil Storage Systems**  
Gilbert & Barker Mfg. Co.

**Oxy-Acetylene. (See Cutting Apparatus, Oxy-Acetylene)**

**Packing**  
Irrington Varnish & Insulator Co.  
Post & Co., Inc., E. L.  
Power Specialty Co.  
U. S. Rubber Co.  
Westinghouse Traction Brake Co.

**Paints and Varnishes. (Insulating)**  
Mica Insulator Co.  
Mitchell-Rand Mfg. Co.  
Standard Paint Co.

**Paints and Varnishes (Preservative)**  
Standard Paint Co.

**Paints and Varnishes for Woodwork**  
National Ry. Appliance Co.

**Park Amusements**  
Este Co., The J. D.

**Paving Bricks, Filler and Stretcher**  
Nelsonville Brick Co.

**Paving Material**  
Am Brake Shoe & Fdy. Co.  
Barrett Co., The  
Nelsonville Brick Co.

**Paving Pitch**  
Barrett Co., The

**Pickups, Trolley Wire**  
Electric Service Supplies Co.  
Ohio Brass Co.

**Pinion Pullers**  
Columbia M. W. & M. I. Co.  
Electric Service Supplies Co.  
General Electric Co.  
Wood Co., Chas. N.

**Pinions. (See Gears)**

**Pins, Case Hardened, Wood and Iron**  
Bemis Car Truck Co.  
Electric Service Supplies Co.  
Ohio Brass Co.  
Westinghouse Traction Brake Co.

**Pipe**  
National Tube Co.

**Pipe Fittings**  
Power Specialty Co.  
Standard Steel Works Co.  
Westinghouse Traction Brake Co.

**Planers. (See Machine Tools)**

**Pliers, Insulated**  
Electric Service Supplies Co.  
Rubber Insulated Metals Co.

**Poles, Concrete**  
Massey Concrete Products Co.

**Pole Reinforcing**  
Hubbard & Co.

**Pole Sleeves**  
Drew Elec. & Mfg. Co.

**Poles and Ties, Treated**  
Linsley Bros. Co.  
Page & Hill Co.  
Western Electric Co.

**Poles, Metal Street**  
Bates Expanded Steel Truss Co.  
Electric Railway Equipment Co.  
Hubbard & Co.

**Poles, Ties, Posts, Piling and Lumber**  
Caarney & Co., B. J.  
Linsley Bros. Co.  
Northern White Cedar Assn.  
Page & Hill Co.  
Western Electric Co.  
Western Red Cedar Assn.  
White Marble Lime Co.

**Poles, Trolley**  
Bayonet Trolley Harp Co.  
Columbia M. W. & M. I. Co.  
Electric Service Supplies Co.  
National Tube Co.  
Nuttall Co., H. D.

**Poles, Tubular Steel**  
Electric Railway Equipment Co.  
National Tube Co.

**Porcelain Bushings**  
Philadelphia Electric Company Supply Dept.

**Post Type Insulators**  
Philadelphia Electric Company Supply Dept.

**Potholes**  
Philadelphia Electric Company Supply Dept.

**Power Saving Devices**  
Arthur Power-Saving Recording Co.  
Economy Electric Devices Co.  
Railway Improvement Co.

**Power Transmission Machines**  
Poole Eng. & Machine Co.

**Presses, Transfer**  
Meissel Rotary Press Co.

**Pressure Regulators**  
General Electric Co.  
Ohio Brass Co.  
Westinghouse Electric & Mfg. Co.

**Protective Devices**  
Philadelphia Electric Company Supply Dist.

**Pumps**  
Allis Chalmers Mfg. Co.

**Punches, Ticket**  
Bonney-Vehslage Tool Co.  
International Register Co., The  
McGill Ticket Punch Co.  
Wood Co., Chas. N.

**Purifiers, Feed Water**  
Scaife & Sons Co., Wm. B.

**Rail Grinders. (See Grinders)**

**Rails, New**  
Cambria Steel Co.  
Midvale Steel & Ordnance Co.

**Railway Safety Switches**  
Westinghouse Elec. & Mfg. Co.

**Rail Welding. (See Brazing and Welding Processes)**

**Rails, Relaying**  
Zelnicker, Walter A., Supply Co., Inc.

#### Rattan

Brill Co., The J. G.  
Electric Service Supplies Co.  
Hale & Kilburn Corp.  
McGuire-Cummings Mfg. Co.  
St. Louis Car Co.

**Recorders, Power Saving**  
Arthur Power-Saving Recorder Co.

**Registers and Fittings**  
Brill Co., The J. G.  
Electric Service Supplies Co.  
Exell Mfg. Co., The  
International Register Co., The  
Ohmer Fare Register Co.  
Rooke Automatic Register Co.  
Standard Register Co.

**Reinforcement, Concrete**  
American Steel & Wire Co.

**Repair Shop Appliances. (See also Coil Binding and Winding Machines)**  
Columbia M. W. & M. I. Co.  
Electric Service Supplies Co.

**Repair Work. (See also Coils)**  
Cleveland Armature Works  
Columbia M. W. & M. I. Co.  
General Electric Co.  
Independent Lamp & Wire Co.  
Westinghouse Elec. & Mfg. Co.

**Replacers, Car**  
Columbia M. W. & M. I. Co.  
Electric Service Supplies Co.  
Reading Specialties Co.

**Resistance, Grid**  
Columbia M. W. & M. I. Co.  
Ellicon Co.

**Resistance, Wire and Tube**  
General Electric Co.  
Western Electric Co.  
Westinghouse Elec. & Mfg. Co.

**Retrievers, Trolley. (See Catchers and Retrievers, Trolley)**

**Reverse Phase Relays**  
Philadelphia Electric Company Supply Dist.

**Rheostats**  
Ellicon Co.  
General Electric Co.  
Mica Insulator Co.  
Westinghouse Elec. & Mfg. Co.

**Roofing, Building**  
Barrett Co., The

**Roofing, Car**  
Keyes Products Co.  
Pantastote Co.  
Standard Paint Co.

**Rubber Specialties of all kinds**  
U. S. Rubber Co.

#### Sanders, Track

Brill Co., The J. G.  
Cleveland Fare Box Co.  
Columbia M. W. & M. I. Co.  
Electric Service Supplies Co.  
Holden & White, Inc.  
Nicholas-Lintern Co.  
Ohio Brass Co.  
St. Louis Car Co.

**Sash Fixtures, Car**  
Brill Co., The J. G.

**Sash Metal, Car Window**  
Hale & Kilburn Corp.

**Scrapers, Track. (See Cleaners and Scrapers, Track)**





First Find the Leaks—Then Stop Them

One-Man

## Roller-Smith Bond Testers

WILL LOCATE THE LEAKS—IN A HURRY

Now is the time to cut generating costs—to cut power costs on car operation. You can do it with ROLLER-SMITH Bond Testers.

The cost of energy wasted due to faulty bonds is enormous. With ROLLER-SMITH Bond Testers you can immediately detect those faults and remedy them. And it requires only *one man* to do it—they're *one-man* bond testers.

Bond Testing with a ROLLER-SMITH outfit is easy, quick, accurate, low cost. Simply drop the contact bar on the rail, rock it back and forth a few times to obtain good contact, turn the hard rubber button until the small pointer is at zero, then read the resistance of the bond direct in units of feet of rail. That's all there is to it.

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SAN FRANCISCO	589 Howard St.
SEATTLE	538 First Ave. S.
ST. LOUIS	Railway Exchange Bldg.
SALT LAKE CITY	Walker Bank Bldg.





**Seats, Car.** (See also Rattan)  
Brill Co., The J. G.  
Hale & Kilburn Corp.  
St. Louis Car Co.

**Seating Materials** (see also Rattan)  
Du Pont Fabrikoid Co.  
Pantasote Co.

**Second-Hand Equipment**  
Archer & Baldwin  
Cleveland Armature Wks.  
Duquesne Elec. & Mfg. Co.  
Electric Equipment Co.  
Exell Mfg. Co., The  
Foster Co. L. B.  
Griewold Machine Co., G. M.  
Hymann Michaels Co.,  
Kerschner Co. Inc., W. R.  
MacGovern & Co. Inc.  
Zelicker Supply Co., W. A.

**Shades, Vestibule**  
Brill Co., The J. G.

**Shovels**  
Hubbard & Co.

**Shovels, Power**  
Allis Chalmers Mfg. Co.  
Blaw-Knox Co.  
Thew Automatic Shovel Co.

**Signals, Car Marker**  
Nichols-Lintern Co.

**Signals, Car Starting**  
Consolidated Car Heating Co.  
Electric Service Supplies Co.  
National Pneumatic Co.

**Signal Systems, Block**  
Electric Service Supplies Co.  
Federal Signal Co.  
Nachod Signal Co., Inc.  
U. S. Electric Signal Co.  
Western Electric Co.  
Wood Co., Chas. N.

**Signal Systems, Highway Crossing**  
Nachod Signal Co., Inc.  
U. S. Electric Signal Co.

**Slack Adjusters**  
(See Brake Adjusters)

**Sleet Wheels and Cutters**  
Anderson Mfg. Co., A. & J. M.  
Bayonet Trolley Harp Co.  
Columbia M. W. & M. I. Co.  
Drew Electric & Mfg. Co.  
Electrical Railway Equipment Co.  
Holden & White, Inc.  
More-Jones Brass & Metal Co.  
Nuttall Co., R. D.

**Snow-Plows, Sweepers and Brooms**  
Brill Co., The J. G.  
Columbia M. W. & M. I. Co.  
McGuire-Cummings Mfg. Co.

**Soldering and Brazing Apparatus**  
(See Welding Processes and Apparatus)

**Speed Transformers**  
Poole Eng. & Machine Wks.

**Splices**  
American Steel & Wire Co.  
Lackawanna Steel Co.

**Splicing Compounds**  
Standard Woven Fabric Co.  
U. S. Rubber Co.  
Westinghouse Elec. & Mfg. Co.

**Splicing Sleeves Copper**  
Clark Elec. & Mfg. Co.

**Splicing Sleeves.** (See Clamps and Connectors)

**Springs, Car and Truck**  
American Steel Foundries  
American Steel & Wire Co.  
Bemis Car Truck Co.  
Brill Co., The J. G.  
Standard Steel Works Co.  
Taylor Elec. Truck Co.

**Sprinklers, Track and Road**  
Brill Co., The J. G.  
McGuire-Cummings Mfg. Co.  
St. Louis Car Co.

**Steps, Car**  
American Mason Safety Tread Co.  
Universal Safety Tread Co.

**Stokers, Mechanical**  
Babcock & Wilcox Co.  
Green Engrg. Co.  
Westinghouse Elec. & Mfg. Co.

**Storage Batteries.** (See Batteries, Storage)

## WHAT AND WHERE TO BUY

**Strand**  
Roebbling's Sons Co., J. A.

**Straps, Car, Sanitary**  
Holden & White, Inc.  
Railway Improvement Co.

**Structural Iron.** (See Bridges)

**Superheaters**  
Babcock & Wilcox Co.  
Power Specialty Co.

**Sweepers, Snow.** (See Snow Plows, Sweepers and Brooms)

**Surface, Jet and Barometric-Condensers**  
Wheeler Mfg. Co., C. H.

**Switch Stands**  
Indianapolis Switch & Frog Co.  
Ramapo Iron Works

**Switchboard Mats**  
Western Electric Co.

**Switches, Automatic**  
Western Electric Co.

**Switches, Lock**  
Weiss Switch Lock Co.

**Switches, Track.** (See Track Special Work)

**Switches and Switchboards**  
Allis Chalmers Mfg. Co.  
Anderson Mfg. Co., A. & J. M.  
Electric Service Supplies Co.  
General Electric Co.  
Nichols-Lintern Co.  
Western Electric Co.  
Westinghouse Elec. & Mfg. Co.  
Wharton Jr. & Co., Wm.

**Tampers, Tie**  
Ingersoll-Rand Co.

**Tanks, Ash and Cold Storage**  
Green Engineering Co.

**Tanks, Oil Storage**  
Gilbert & Barker Mfg. Co.  
Milwaukee Tank Works.

**Tapes and Cloths.** (See Insulating Cloths, Paper and Tape)

**Telephones and Parts**  
Electric Service Supplies Co.  
Western Electric Co.

**Testing, Commercial and Electrical**  
Elec'l Testing Laboratories

**Testing Instruments.** (See Instruments, Electrical Measuring, Testing, etc.)

**Thermostats**  
Consolidated Car Heating Co.  
Gold Car Heating & Lighting Co.  
Holden & White, Inc.  
Railway Utility Co.  
Smith Heater Co., Peter

**Thread-Cutting Tools**  
Williams & Co., J. H.

**Ticket Boxes**  
Macdonald Ticket Box Co.

**Ticket Choppers and Destroyers**  
Electric Service Supplies Co.

**Tie Plates**  
Cambria Steel Co.  
Midvale Steel & Ordnance Co.

**Ties, Mechanical**  
Dayton Mechanical Tie Co.

**Ties and Tie Rods, Steel**  
American Bridge Co.  
Barbour-Stockwell Co.  
Carnegie Steel Co.  
International Steel Tie Co.

**Ties, Wood Cross.** (See Poles, Ties, Posts, etc.)

**Tool Holders**  
Williams & Co., J. H.

**Tools, Track and Miscellaneous**  
American Steel & Wire Co.  
Columbia M. W. & M. I. Co.  
Chicago Pneumatic Tool Co.  
Electric Service Supplies Co.  
Hubbard & Co.  
Keyes Products Co.  
Railway Track-work Co.

**Torches, Acetylene.** (See Cutting Apparatus)

**Towers and Transmission Structures**  
American Bridge Co.  
Archbold-Brady Co.  
Bates Expanded Steel Truss Co.  
Westinghouse Elec. & Mfg. Co.

**Tower Wagons and Auto Trucks**  
McCardell & Co., J. B.

**Track, Special Work**  
Barbour-Stockwell Co.  
Cleveland Frog & Crossing Co.  
Columbia M. W. & M. I. Co.  
Indianapolis Switch & Frog Co.  
New York Switch & Crossing Co.  
Ramapo Iron Works  
St. Louis Frog & Switch Co.  
Wharton Jr. & Co., Wm.

**Transfers** (See Tickets)  
Archbold-Brady Co.

**Transfer Tables**  
American Bridge Co.

**Transfer Issuing Machines**  
Ohmer Fare Register Co.

**Transformers**  
Allis Chalmers Mfg. Co.  
General Electric Co.  
Western Electric Co.  
Westinghouse Elec. & Mfg. Co.

**Treads, Safety, Stairs, Car Steps**  
American Mason Safety Tread Co.  
Universal Safety Tread Co.

**Trolley Bases**  
Anderson Mfg. Co., A. & J. M.  
Electric Service Supplies Co.  
General Electric Co.  
Holden & White, Inc.  
Holland Trolley Supply Co.  
More-Jones Brass & Metal Co.  
National Railway Appliance Co.  
Nuttall Co., R. D.  
Ohio Brass Co.

**Trolley Bases, Retrieving**  
Holden & White, Inc.

**Trolley Harps**  
Holland Trolley Supply Co.

**Trolley Poles**  
Holland Trolley Supply Co.

**Trolleys and Trolley Systems**  
Ford Chain Block & Mfg. Co.

**Trolley Shoes**  
Holden & White, Inc.  
Miller Trolley Shoe Co.  
Trolley Wheels. (See Wheels, Trolley)

**Trolley Wire**  
Roebbling's Sons Co., John A.

**Tracks, Car**  
American Steel Foundries  
Bemis Car Truck Co.  
Brill Co., The J. G.  
McGuire-Cummings Mfg. Co.  
St. Louis Car Co.

**Trucks, Car**  
Taylor Elec. Truck Co.

**Tubing, Steel**  
National Tube Co.

**Turbines, Steam**  
Allis Chalmers Mfg. Co.  
General Electric Co.  
Terry Steam Turbine Co.  
Western Electric Co.  
Westinghouse Elec. & Mfg. Co.

**Turbines, Water**  
Allis Chalmers Mfg. Co.

**Turnstiles**  
Percy Mfg. Co., Inc.  
Vacuum Impregnation

**Vacuum Pumps**  
Wheeler Mfg. Co., C. H.

**Vacuum Impregnation**  
Allis Chalmers Mfg. Co.

**Valves**  
Ohio Brass Co.  
Westinghouse Traction Brake Co.

**Varnishes.** (See Paints, etc.)

**Ventilators, Car**  
Brill Co., The J. G.  
Holden & White, Inc.  
National Railway Appliance Co.  
Nichols-Lintern Co.  
Railway Utility Co.  
St. Louis Car Co.

**Vises, Pipe**  
Williams & Co., J. H.

**Voltmeters.** (See Instruments)

**Washers**  
Bound Brook Oil-less Bearing Co.

**Waste Saturation Systems**  
Milwaukee Tank Works

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Scaife & Sons Co., Wm. B.

**Water Cooling Towers**  
Wheeler Mfg. Co., C. H.

**Weed Killers**  
Chipman Chemical Engr. Co.

**Welded Rail Joints**  
Lincoln Bonding Co.

**Welding Processes and Apparatus**  
Electric Railway Improvement Co.  
General Electric Co.  
Lincoln Bonding Co.  
Metal & Thermit Corp.  
National Ry. Appliance Co.  
Westinghouse Elec. & Mfg. Co.

**Welders, Portable Electric**  
Electric Railway Improvement Co.  
Indianapolis Switch & Frog Co.  
Lincoln Bonding Co.

**Wheel Guards.** (See Fenders and Wheel Guards)

**Wheel Presses.** (See Machine Tools)

**Wheels, Car, Cast Iron**  
Assn. of Mfrs. of Chilled Car Wheels  
Bemis Car Truck Co.  
Griffin Wheel Co.

**Wheels, Car, Steel and Steel Tired**  
American Steel Foundries  
Bemis Car Truck Co.  
Carnegie Steel Co.  
Standard Steel Works Co.

**Wheels, Trolley**  
Anderson Mfg. Co., A. & J. M.  
Bayonet Trolley Harp Co.  
Bound Brook Oil-less Bearing Co.  
Columbia M. W. & M. I. Co.  
Electric Railway Equipment Co.  
Electric Service Supplies Co.  
Eureka Co.  
General Electric Co.  
Hensley Trolley Mfg. Co.  
Holland Trolley Supply Co.  
More-Jones B. & M. Co.  
Nuttall Co., R. D.  
Star Brass Works

**Whistles, Air**  
General Electric Co.  
Ohio Brass Co.  
Westinghouse Traction Brake Co.

**Wire Rope**  
American Steel & Wire Co.  
Roebbling's Sons Co., John A.

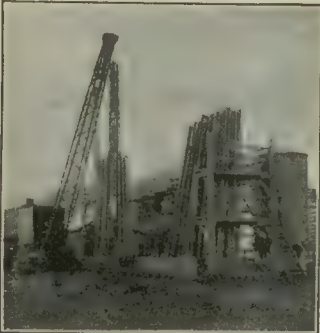
**Wires and Cables**  
Aluminum Co. of America  
American Elec'l Works  
American Steel & Wire Co.  
Bridgeport Brass Co.  
D & W Fuse Co.  
General Electric Co.  
Kerite Insulated Wire & Cable Co.  
Roebbling's Sons Co., John A.  
Rome Wire Co.  
Western Electric Co.  
Westinghouse Elec. & Mfg. Co.

**Wood Preservatives**  
Barrett Co., The  
Linsley Bros. Co.

**Wood Working Machinery**  
Allis Chalmers Mfg. Co.

**Wrenches**  
Williams & Co., J. H.

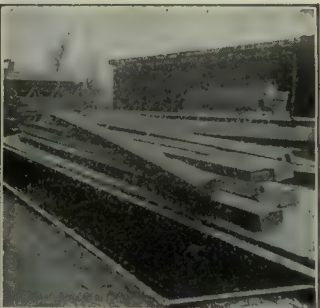




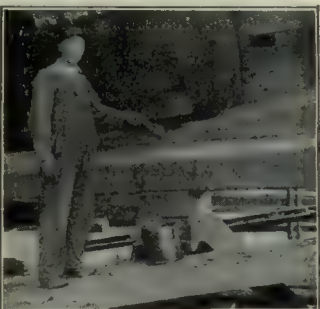
Commercial Plant for Creosoting Poles by the Open-Tank System. Western Wood Preservers, Sandpoint, Idaho. (W. C. Assoc.)



Spraying roof deck of box car with Carbosota Creosote Oil (no paint used).



Creosoting car sills by open tank process.



Brush-treating faying surfaces of ship timbers with Carbosota.



Faying surfaces of timbers brush-treated with Carbosota. (Courtesy Peninsula Ship Bldg. Co.)



## 100% American

This trade-mark stands for everything which the words "100% American" imply, the world over.

It is, first of all, the most efficient wood preservative on the market.

It is strictly honest in quality.

It is practical—adaptable to *all conditions*.

It is of American origin, a modern, distinctly American specification, developed by Americans in American laboratories, and is second to none in the world.

It is the *universal wood-preservative*, available everywhere in the United States, and eventually will be obtainable everywhere in the world.

Carbosota Creosote Oil is, of course, intended for non-pressure processes. It meets U. S. Shipping Board Emergency Fleet Corporation Specification No. 128, also U. S. Railroad Administration Specification No. R828A.

(Green wood cannot be effectively creosoted by non-pressure processes. It should be air-dry. In regions of moist, warm climate, wood of some species may start to decay before it can be air-dried. Exception should be made in such cases, and treatment modified accordingly.)

Specify "Carbosota" for results.

Technical service, specifications, etc., may be obtained gratis by addressing nearest office.

### The Barrett Company

New York	Chicago	Philadelphia	Boston	St. Louis
Cleveland	Cincinnati	Pittsburgh	Detroit	New Orleans
Birmingham	Kansas City	Minneapolis	Nashville	
Salt Lake City	Seattle	Peoria	Atlanta	Duluth
Milwaukee	Bangor	Washington	Johnstown	Lebanon
Youngstown	Toledo	Columbus	Richmond	Bethlehem
Elizabeth	Buffalo	Baltimore	Montreal	Toronto

THE BARRETT COMPANY, Limited: St. John, N. B. Halifax, N. S. Winnipeg Vancouver Sydney, N. S.



The Open-Tank Process: Simple wooden tank (lined with sheet iron) equipped with steam coils and small derrick.



Spraying: Applying Carbosota to ends, mortises, and tenons (points of contact) of caps and stringers for trestle.



Brush-treating pole. Note use of a mop, which is more satisfactory than a brush.



Home-made creosoting tank, built of common lumber, lined with galvanized sheet iron soldered at the joints.



1-gallon can, 5-gallon can, 10-gallon can, 1 wooden barrel. (Any quantity may be conveniently obtained, including tank-car quantities—10,000 gallons.)



Exceptionally artistic effect resulting from the use of Carbosota Creosote Oil as a paint.



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# GURNEY

## *The IDEAL Bearing*

Harassed on every side by the rising cost of labor, of material and of public charges, with little or no immediate opportunity to absorb such burdens through the medium of a higher rate of fare —

Electric railways have been obliged as never before to seek the utmost in efficiency and in economy.

No one way out has met with such a hearty reception as the Gurney-Equipped Light-Weight Safety Car because of the opportunities it affords to give faster and more frequent service at less wear and tear, at less cost of maintenance, at less demand on the power station and at less strain upon the platform payroll.

*Our Engineers will be glad to explain what Gurney  
Ball Bearings will do for your Electric Cars.*

## GURNEY BALL BEARING CO.

Conrad Patent Licensee

### JAMESTOWN, NEW YORK





*The Front-Entrance, Center-Exit Car is capable of maintaining a high schedule speed.*



*With the Conductor at the center, the front half of the car becomes a loading platform.*

## The Right Car for Crowded Lines and Terminals

**T**O watch, for the first time, a Peter Witt Car load at a terminal is a sight that would gladden the heart of any traffic manager. To see it gulp in a big group of passengers at a busy corner and be on its way in half the usual time, would fill him with enthusiasm.

All this ease of handling passengers comes from not holding up the crowd to collect fares and having no conflicting streams of passengers.

Tests made at Youngstown showed that the loading times of cars, of about the same seat-

ing capacity, expressed in seconds per passenger were as follows: Peter Witt Car, 0.9 second; standard-type car with doors at both ends, 1.35 seconds, and high-floor center-entrance car, 1.5 seconds.

Figure your schedule on that basis and see what it would mean for your lines in additional car miles operated at your present platform expense.

Furthermore, the Peter Witt Car is readily adapted to one-man operation during slack-hour periods by simply locking the center doors and moving the fare box to the front.

*For complete information on the Peter Witt Car apply to*

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PHILADELPHIA, PA.

G. C. KUHLMAN CAR CO.  
CLEVELAND, OHIO

AMERICAN CAR COMPANY  
ST. LOUIS, MO.

WASON MANUFACTURING CO.  
SPRINGFIELD, MASS.







## Good-will and The Investors

"Better buy some traction stock now that these Birney Safety Cars have put the company in right with the public."

"That's what they all say. I bought the day after the cars were put in service."

Every going business must have good-will and no business needs it more than the street railway.

The "public be pleased" policy of the up-to-date traction company can have no stronger working basis than Birney Safety Car service.

Employees are affected by it and show more interest and satisfaction in their work.

Investors are learning that Birney Safety Car service means growing good-will, and growing good-will means growing stability as well as growing earning power.

They are learning, too, that these cars not only improve the service in every particular, but they reduce all operating and maintenance costs.

*For complete information on the Birney Safety Car apply to*

THE J. G. BRILL COMPANY  
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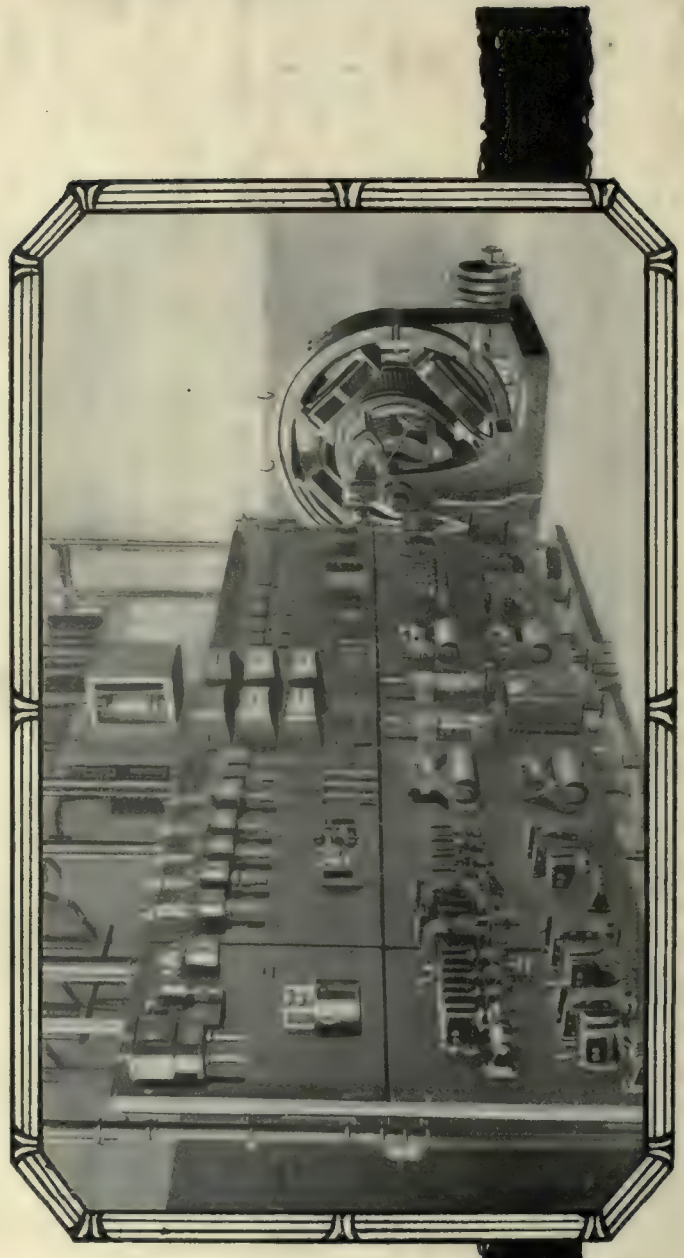
# Made Possible By One Automatic Substation

On this one railway division alone twenty-four miles of copper feed wire were released by the installation of one 600-kw., 2-unit G-E automatic substation.

This instance is in itself a powerful argument for a more extensive

application of automatically controlled substations to railway service.

The General Electric Company developed the first automatic equipment and has since put into actual operation over thirty others.



**FOR SALE**

**Copper Feed Wire**

Approx. 20 miles, 600,000 CM, steel, triple, weatherproof, stranded cable on reels, 37' about 1500 ft. each. Installation and removal of cable by one man. Price, \$16.00 plus F.O.B. cars Providence, R.I. per lb. plus \$12.00 for each reel. 28¢ per lb. weatherproof, triple type cable with triple insulation. Price, \$16.00 plus F.O.B. cars Providence, R.I. per lb. plus \$12.00 for each reel.

Credit allowed for returned reels by freight.

**THE RHODE ISLAND CO.**  
PROVIDENCE, R. I.

W. C. Rife, Superintendent



# GENERAL ELECTRIC COMPANY



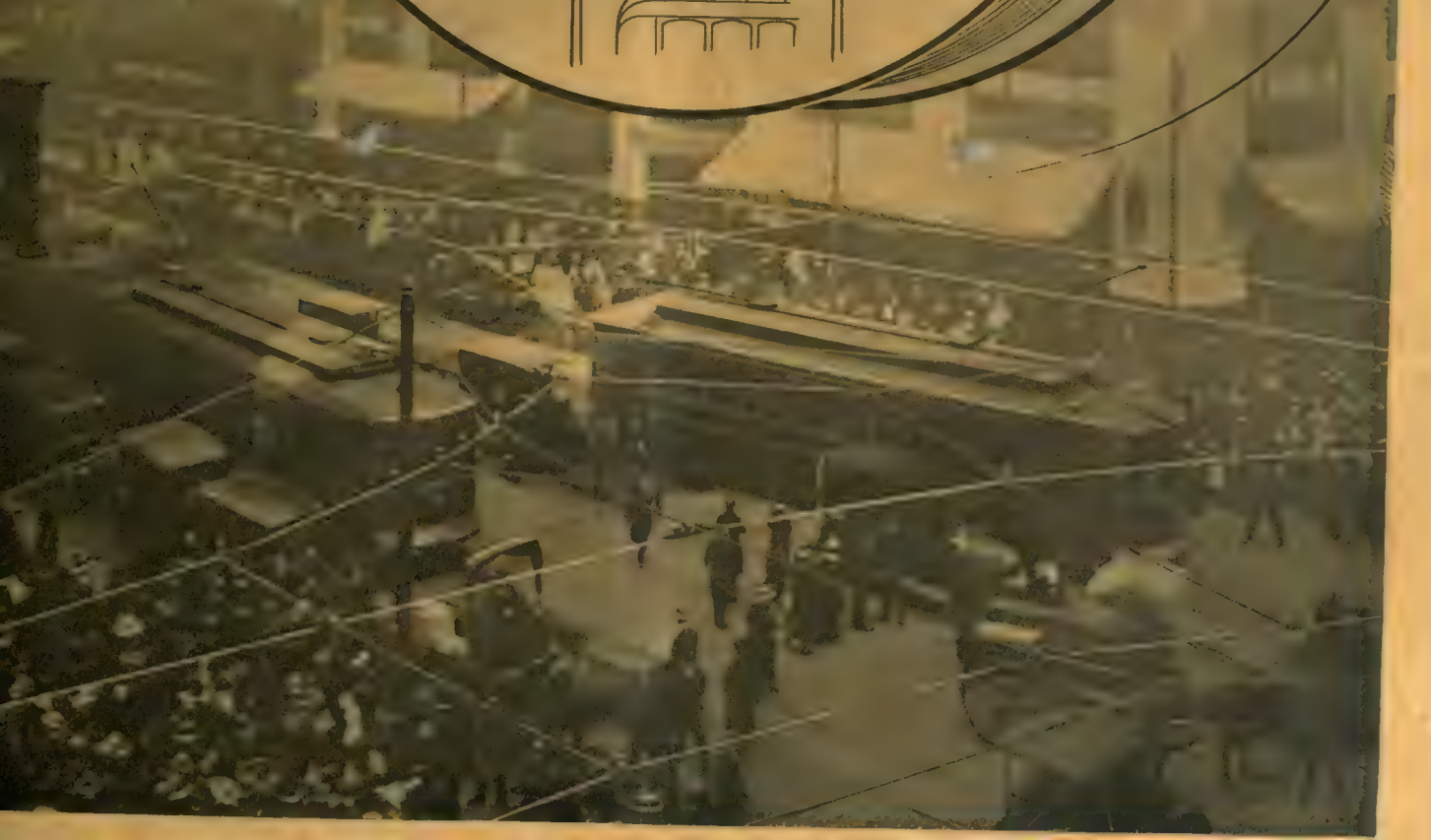
# ELECTRIC RAILWAY JOURNAL

**"Phono-Electric"**  
remains  
the same —  
first, last and  
always —  
the trolley  
wire of  
longest life —  
unchanged  
by any stress  
of hard  
service

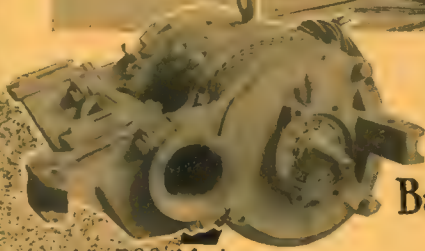
*Ask for  
our Bulletin*

Bridgeport Brass Company  
Bridgeport, Connecticut

**"Phono-Electric"**







No. 506 Motor  
Showing Ball Bearings

**No. 506 Motors**  
with either  
Ball or Sleeve Armature Bearings  
for



No. 506 Motor  
Showing Sleeve Bearings

**Safety Cars**

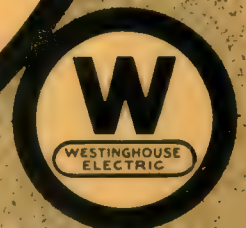
### **Safety Car Facts:**

When asked why so many old cars were stored in a vacant lot outside the car barn, the railway official replied:

"We expect to burn them and install Birneys."

They already have 61 One-man Safety Cars in service.

Westinghouse Electric & Mfg. Co.  
East Pittsburgh, Pa.



# Westinghouse



# Electric Railway Journal

H. W. BLAKE, *Editor*

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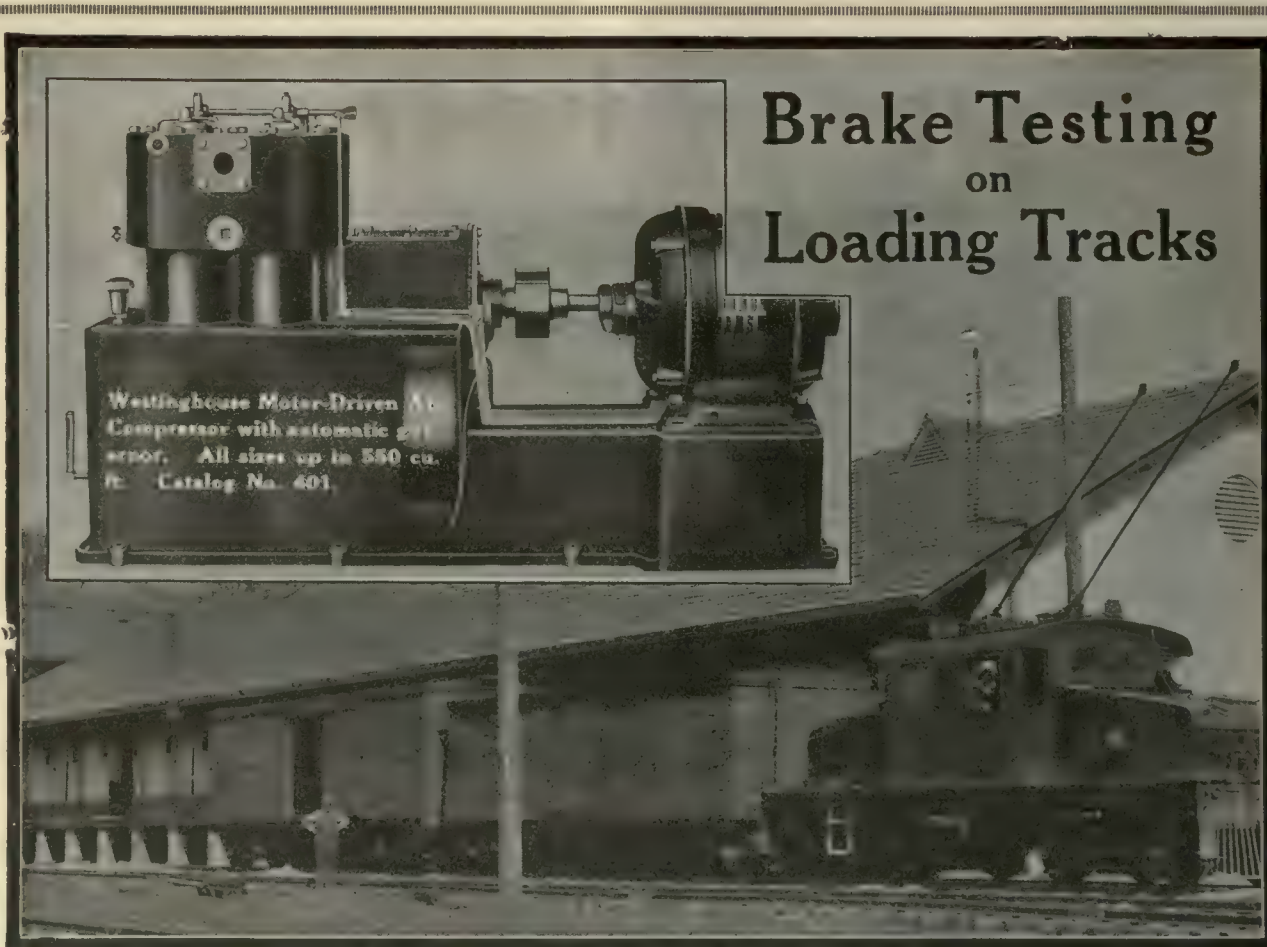
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**Brake Testing  
on  
Loading Tracks**

Westinghouse Motor-Driven Air Compressor with automatic control. All sizes up to 550 cu. ft. Catalog No. 401.

Cars being loaded on freight house tracks offer an excellent opportunity for the inspector to test and condition the air brakes before the cars are switched into the train and sent on their journey. Train detentions, due to neglected air brakes, will be largely reduced if an air compressor be installed in the freight house and the loading tracks be piped to carry air to the cars.

### **Westinghouse Electrically-Driven Air Compressors, Being Compact, Efficient and Durable,**

are specially suited to air brake testing plants of all kinds and sizes, and particularly to those isolated plants which require compressors automatically controlled, of thorough reliability, and which need little attention to operate and maintain.

## **Westinghouse Traction Brake Company**

General Offices and Works, Wilmerding, Pa.

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Boston, Mass.  
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# Westinghouse

## Type K-3 Lightning Arresters

For Car, Line and Station Protection up to 1500 Volts Direct Current

Highest Protective Ability  
Minimum Inconvenience  
Lowest Maintenance Cost

Once mounted on top or under the car, they require no further attention except an occasional inspection.



Type K-3 Arrester, without Spark Gap and Resistance.



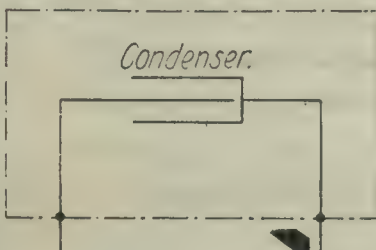
Type K-3 Arrester, with Spark Gap and Resistance, Showing accessibility of Spark Gap Chamber.

Type K-3 Arresters make use of the condenser principle. A condenser passes alternating current with a freedom depending partly on the constance of the condenser, and partly on the frequency of the current.

Static discharges induced by lightning are of frequencies ranging up to several million cycles, making the condenser principle ideal for the purpose.

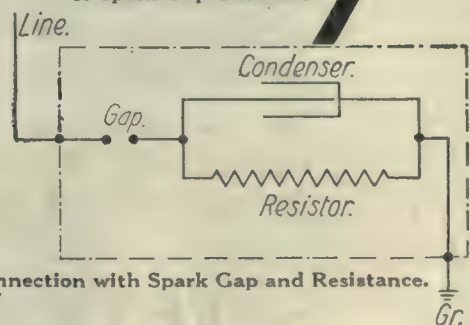
The highest available degree of protection is, therefore, obtained with but an extremely small maintenance expense for infrequent inspection.

Type K-3 Arresters are fully described in Section I-A of the Westinghouse Annual Catalogue of Electrical Supplies.



Leads to Line and Ground.

Connection without Spark Gap and Resistance.



Connection with Spark Gap and Resistance.

### Westinghouse Electric & Manufacturing Company

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Wilkes-Barre, Pa.





# The Safety Car is Safe

That a car operated by one person should be safer than a car operated by two seems incredible. But it's so.

Because when you put a Safety Car Control Equipment on a car, you largely supersede the uncertainty of *human* operation by the certainty of *automatic* operation in preventing the single largest cause of car accidents, namely, boarding and alighting.

The reduction of platform accidents with one-man Safety Cars has proved so great, that we earnestly urge you to install Safety Car Control Equipments on all your present *two-person* cars.

This change will do even more than assure greater safety to your passengers. It will readily enable you to run these cars with but one operator for 60 to 80 per cent. of their daily mileage!

## SAFETY CAR DEVICES CO.

Main Office—Boatmen's Bank Bldg., ST. LOUIS, MO.

CHICAGO  
Railway Exchange Building

NEW YORK  
City Invest. Building

PITTSBURGH  
Westinghouse Building

CANADA—Canadian Westinghouse Co., Ltd., Hamilton, Ont.





# PRODUCTS

*Quality First*

## Good Bonding— An Essential Economy

It costs money to do without good bonds.

Are you having trouble with burnt-out motors? Good bonding will prevent most of that.

Are your cars habitually late? Good bonding speeds motors.

Is your station equipment overloaded or is your power cost high? Good bonding prevents power waste.

## O-B Gas Weld Bonds Especially Economical

The installed cost of O-B Gas Weld Bond is low. This is due to the speed and simplicity of the process and the short length of the bond itself.

The contact—or rather the union—between rails is of low resistance and permanent.

Good bonding pays.

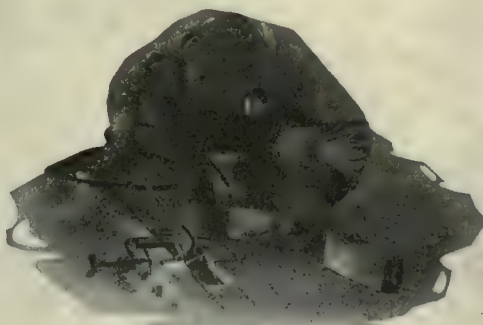
*O-B Bonds are good bonds.*

**The Ohio Brass Company**  
Mansfield, Ohio

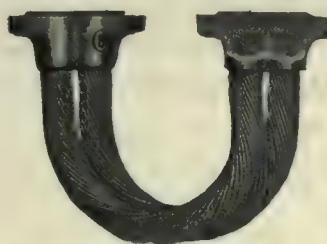
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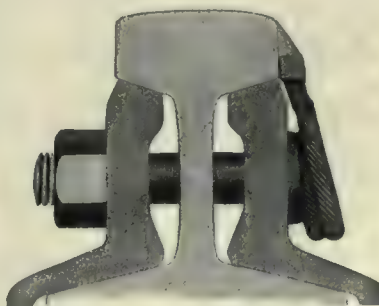
Pittsburgh  
San Francisco



Bonding Paved Track



Type S. T. (Patented)  
(Steel Armored Terminal)  
Right terminal sectioned to show  
how copper is headed over.



Section of O-B G. W. Bond on rail.



Type G. W. (Patented)  
(All Copper Terminal)



# WESTERN RED CEDAR POLES



## WESTERN RED CEDAR POLES IN PITTSBURGH

**View No. 1**, in the lower left-hand corner, shows a line of 50-foot Western Red Cedar Poles at Pittsburgh, in service eighteen years, being replaced by new 50-foot Western Red Cedar. This line carries 3—No. 1/0 W.P. Copper Wires; 12—No. 6 W.P. Copper Wires; 20—No. 12 Bare Iron Telephone Wires; 1—50 Pair Telephone Cables; 4 Telephone Twists.

**View No. 2** shows 40-foot Western Red Cedar Poles in service 10 years. Carry 12 wires. **View No. 3** shows 45-foot Western Red Cedar Poles at Pittsburgh, in service 10 years. **View No. 4** shows another line of 45-foot Western Red Cedar at Pittsburgh.

Western Red Cedar Poles are noted for long life, strength, straightness and sightliness.

**WESTERN RED CEDAR ASSOCIATION, Peyton Bldg., Spokane, Wash.**

*Ask your dealer about Butt-Treating. It adds many years of service to every pole.*





# Cut Your Labor Costs 50%

with

## INTERNATIONAL STEEL TWIN TIES

Base of Rail



This diagram shows graphically the reason why Steel Twin Tie Track can be built at a large saving compared to wooden tie track on concrete ballast or at the same cost as plain ballast construction.

It represents the comparative sizes of the track trench required for wooden tie track designs (the larger one) and that required for steel twin tie track (the smaller one).

An 8-foot wooden tie requires a trench 9 feet wide, and whether concrete or broken rock ballast is used the trench must be 12 to 14 inches deep.

Standard Steel Twin Tie Track requires a trench only 7 inches deep and 7 feet wide.

***Look at the shaded portion of the diagram;  
it represents the labor saved in excavating***

***AND the labor saved in mixing  
concrete***

***AND the labor saved in placing  
concrete***

***AND the labor saved in repaving***

Railway track all over the country is in a run down state—far below that 85% new condition which experts call excellent maintenance.

And while your track is run down and is causing delays in schedules, losses in the power house and deterioration of equip-

ment, you cannot render the service the public demands if it is going to look favorably on a fare-increase.

Durable smooth steel twin tie track with a ten-year record behind it will win good will for you.

*Our 1919 prices reflect steel market declines  
Get them for your estimates*

# The International Steel Tie Company

Manufacturers of Steel Twin Ties and Crossing Foundations

General Sales Office and Works: Cleveland, Ohio





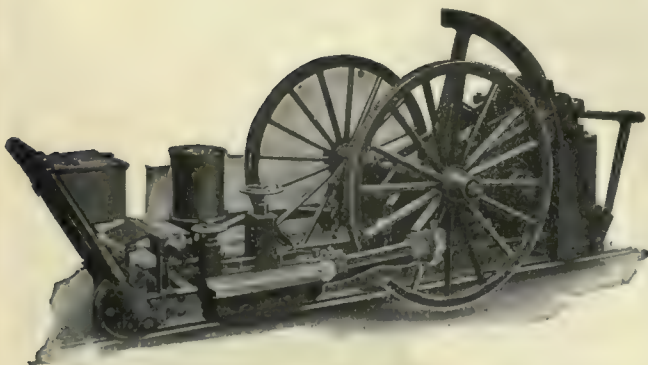
## Very Small to Measure— A Mighty Force for Harm

Beginnings of rail corrugation are like the storied leak in the dyke of Holland that the little boy stopped up by holding his finger in it until help and repairs came.

Like everything else rail corrugation has to have a beginning. Once started it generally grows very fast. Neglected it will finally ruin the track.

## Reciprocating Track Grinders

are equally capable of grinding out corrugations whether they are shallow or deep. Indeed they have frequently saved great sums of money for traction companies by restoring to useful service stretches of track which had reached such bad condition due to corrugations or badly cuffed joints that they were apparently beyond any remedy short of complete replacement.

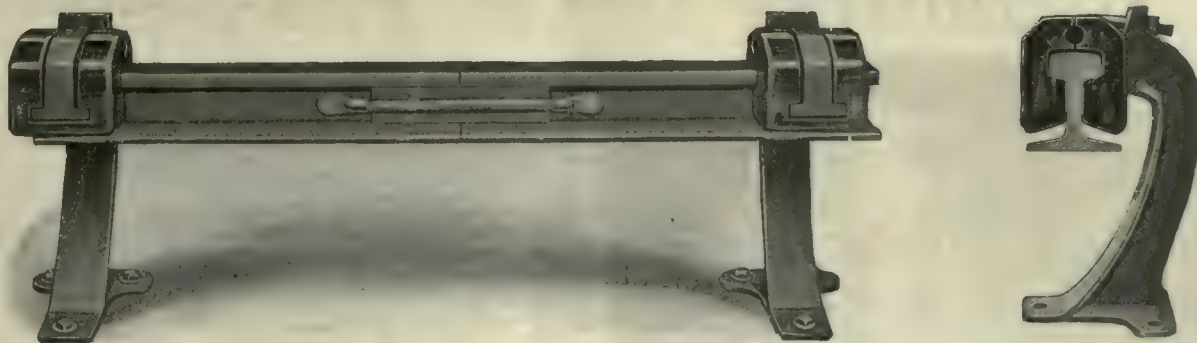


True economy in track grinding, however, consists of taking hold of the trouble in time, and before it becomes so serious as to cause damage to track foundations and make necessary the grinding away of a great amount of the rail surface.

There is no economy in waiting until the impact of rolling stock turns the infection of corrugation into chronic track disease.

**Railway Track-work Co.**  
30th and Walnut Sts., Philadelphia

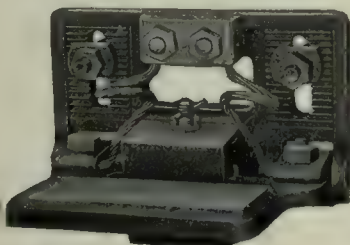




## Keystone Contact Rail Material



Typical Contact Rail Insulator



Typical Contact Rail Shoe

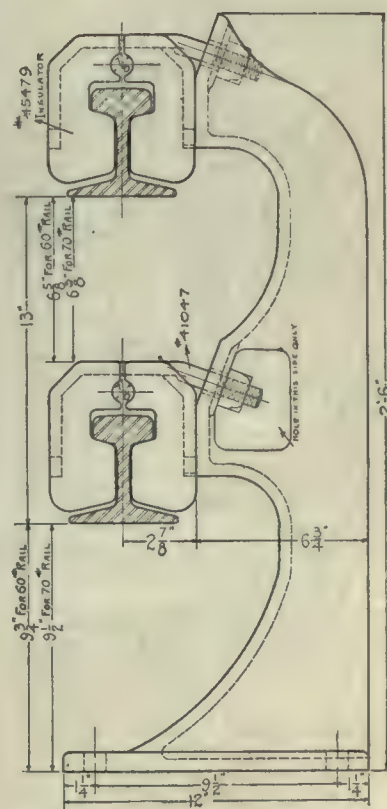


Crane Type  
Contact Rail  
Collector

A broad line of electrical equipment for light or heavy shipyard or industrial cranes, industrial haulage systems and electric railways. Including under-running and over-running contact rail insulators, standards, contact rail shoes and collectors and other equipment that will meet practically all conditions.

Being specialists in this line we are also prepared to recommend and supply material of special design to meet any complex conditions you may have.

Write for new data sheets.



Typical Double Tee Rail Standard

# ELECTRIC SERVICE SUPPLIES CO.

Manufacturer of Railway Material and Electrical Supplies

PHILADELPHIA

PITTSBURGH

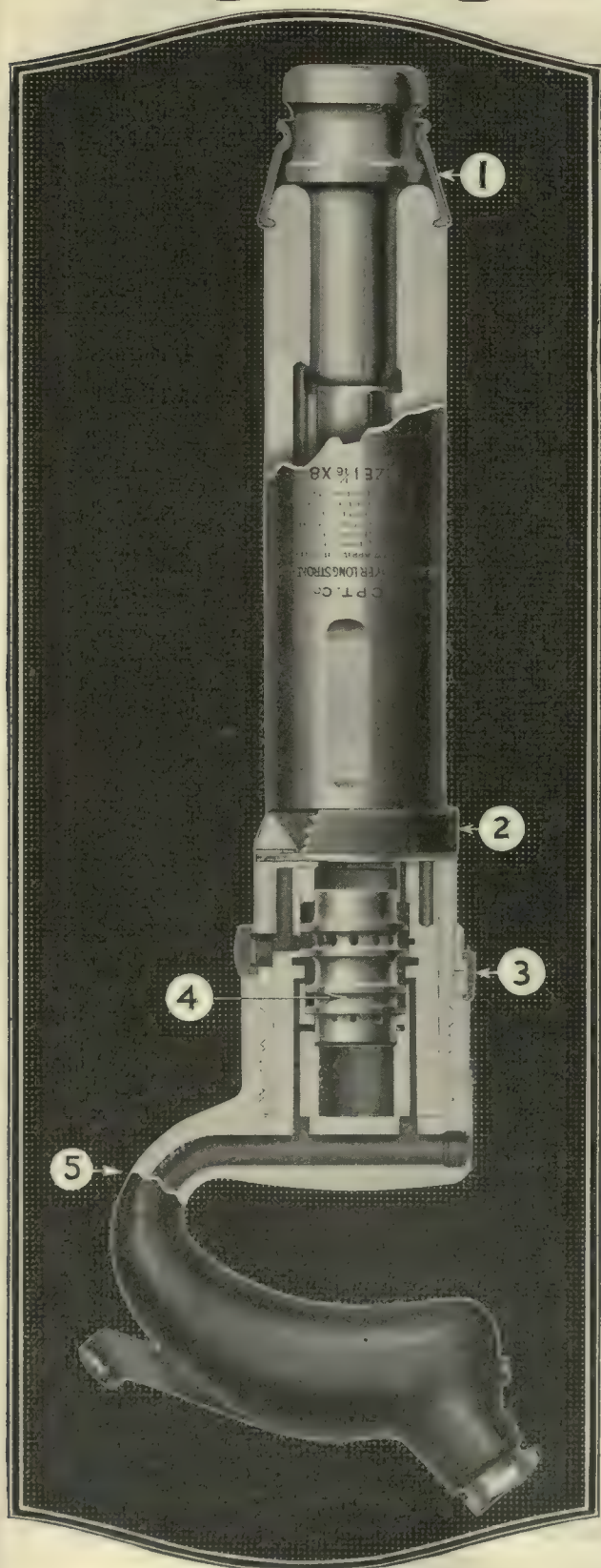
NEW YORK

CHICAGO

17th and Cambria Streets 335 Oliver Building 50 Church Street Monadnock Building



# Regarding Boyer Patents—



**T**HE purpose of this notice is to clearly set forth details of construction entering into Boyer Pneumatic Hammers, which are covered by basic patents owned by us, that our rights may be understood and respected.

These patents have been made the subject of unscrupulous infringement, against which we have sought the protection of the Courts in proceedings pending.

The accompanying sectional view of the Boyer Hammer illustrates five patented features upon which our claims are based, viz.:

- 1 Boyer Patent 866, 573, Sept. 17, 1907, covers a clip for retaining the rivet set or other working tool in association with the cylinder and permitting a longitudinal movement of the one part with respect to the other.
- 2 Boyer Patent 917, 242, April 6, 1909, also covers a spring clip to cover the outlets of the exhaust passages and serving to deflect the exhaust to the under side of the hammer.
- 3 Boyer Patent 917, 242, April 6, 1909, also covers a locking mechanism consisting of teeth cut on the outer edge of the screwed handle of the hammer and the handle and cylinder being locked together by a ring surrounding the cylinder and having teeth to engage the teeth in the handle and being held in place by a key and spring clip.
- 4 Boyer Patent 917, 242, April 6, 1909, and Meissner Patent 822, 146, May 29, 1906, cover in addition to other features the location of a hollow cylindrical valve at the rear end of the hammer and in alignment with the cylinder and adapted to be moved in one direction by the live motive fluid and in the opposite direction by the air compressed by the piston on its rearward travel.
- 5 Doughty Patent 730, 887, June 16, 1903, covers the fabrication of the handle made of steel. The main air supply port through the handle can first be drilled and the neck of the handle then be bent to finished shape.

Testimony is now being taken on our application for an injunction and an accounting of profits and damages.

All buyers and users of pneumatic hammers are urged to protect themselves by refraining from the purchase of hammers, or parts of hammers, that infringe these patents.

The genuine Boyer Pneumatic Hammer is manufactured only by the Chicago Pneumatic Tool Company and should be purchased by specifying the name "*Boyer*," a trademark registered in the United States Patent Office.

## Chicago Pneumatic Tool Company

*Pioneers in Pneumatic Tool Progress*

New York

Chicago

San Francisco

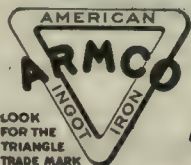
*Sales offices all over the world*



## heavy traffic has rolled over these ARMCO iron culverts for 11 years

Here is a real test for a culvert—11 years on the main line! Just think of how many trains have passed over these rails since these culverts were put in in 1908.

Yet today these ARMCO culverts of pure iron are in as good condition as when they were installed. Could more convincing proof be desired of the *permanence* of ARMCO Iron Culverts?

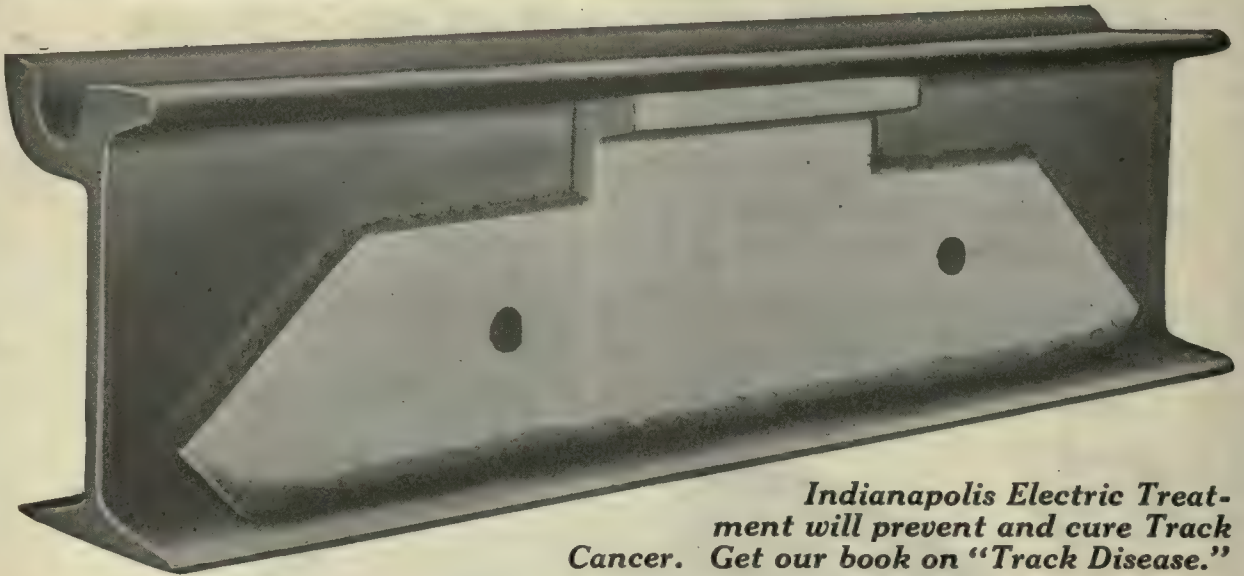


There is a manufacturer in nearly every state, and in Canada, making genuine rust-resisting ARMCO IRON CULVERTS and other products of ARMCO IRON such as flumes, siphons, tanks, road signs, roofing, etc. Write for full information and nearest shipping point on products in which you are interested.

**ARMCO IRON CULVERT & FLUME MFRS. ASSN.**  
**TRANSPORTATION BLDG. CHICAGO**



## "Apex" Joint for Guard and Girder Rail



*Indianapolis Electric Treatment will prevent and cure Track Cancer. Get our book on "Track Disease."*

Each loose, leaky joint wastes the earnings or savings of 10 good joints through loss of current, continual maintenance and destruction of track-paving and rolling stock. This LEAK can be permanently STOPPED in no more time and at no greater cost than will be necessary in making temporary repairs.

## "INDIANAPOLIS"

### "Simplex" or "Apex" Welded Joints Are Saving Millions of Dollars

on more than a hundred electric railways—railways that use either Tee-rails or Girder-rails. In other words, over 100 railways have eliminated cupped rail ends, loose pounding joints and bad bonds—the cause of 90% of track and rolling stock maintenance.

Indianapolis Joints insure OVER 100% strength and conductivity compared with unbroken new rail.

In preparing your budget for 1919 get our proposition on welding joints for relaying or new track. The prices on Indianapolis Welders, Steel and Joints, *never having advanced* in proportion to other track materials, will continue as at present, and we are now offering *immediate deliveries*.



"Simplex" Joint for High Tee Rail

**Indianapolis Switch & Frog Company, Springfield, Ohio**



# National Pneumatic Door and Step Control has brought the Laborless Car

The curse of Adam has been lifted off of the electric car platform by National Pneumatic Door and Step Control which has put intelligence before physique, brain before brawn.

On subway and elevated cars National Pneumatic control reduces the duties of the guard to that of an *announcer*. On surface cars National Pneumatic control reduces the duties of the conductor to that of a *cashier*.

Could your platform problem be made simpler than this?



## NATIONAL PNEUMATIC COMPANY

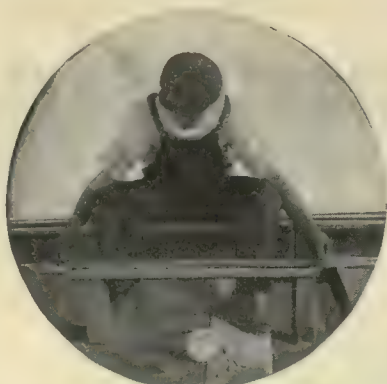
INC.

50 Church St. New York



515 Laflin St. Chicago





1. Applying Molasses to Asbestos Strips for Luting between Edge of Mold and Rails.



2. Applying Asbestos and Molasses Strips to Rails previous to Adjusting Mold.



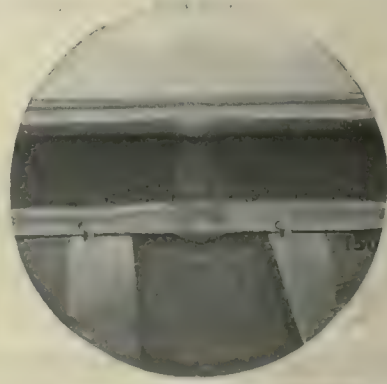
3. Adjusting Two-Part Mold to Rails.



4. Mold and Crucible Compound in position ready for preheating—box containing Thermit additions.



5. Preheating Rail Ends. Heating Thermit additions and baking mold in one operation.



6. Finished Thermit fully welded. Insert Rail Joint.

# What is the difference between a welded rail joint and a **THERMIT Weld?**

In a merely *welded* joint, the fissure between the rails is only *partly* obliterated. The joint is still weaker than the rail itself. The return circuit is retarded.

In a THERMIT Weld the rail joint ceases to exist. *It is obliterated.* The union of rails is 100% efficient, both mechanically and electrically. The resistance to the return circuit is reduced. Electrolytic damages are prevented. Years are added to the life of the track. And the cost is lowest in the end.

*Allow us to send Catalog 1232—or to send a representative to discuss the matter more fully.*

**Metal & Thermit Corporation**  
120 Broadway, New York

*Successors to*

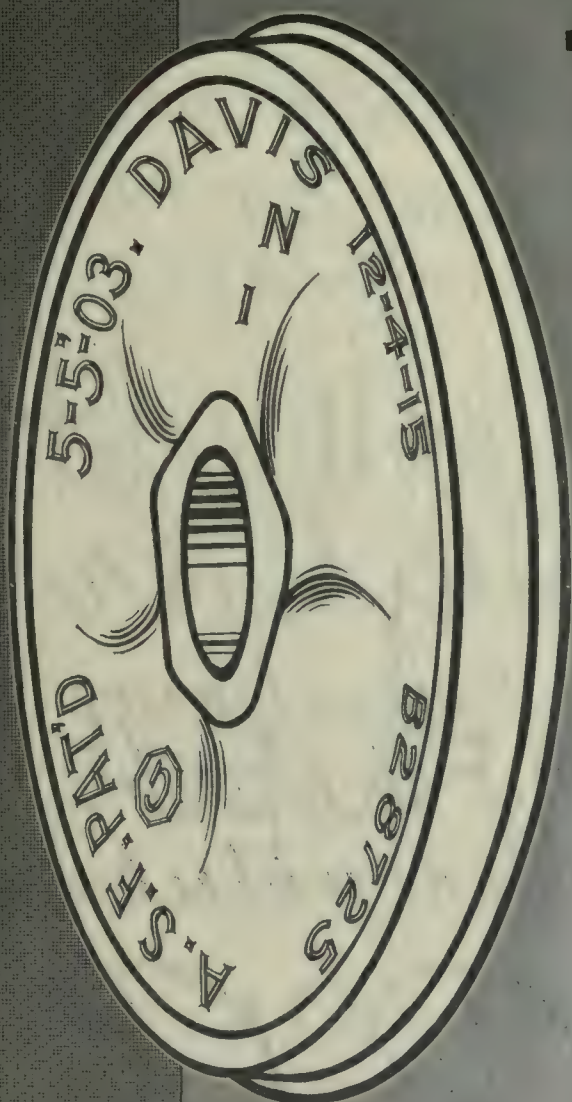
**Goldschmidt Thermit Co., Goldschmidt Detinning Co.**

Branch Offices and Shops: 1427 Western Ave., Pittsburgh, Pa. 7300 So. Chicago Ave., Chicago. 329 Folsom St., San Francisco. 15 Emily St., Toronto, Ont.

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# DAVIS STEEL WHEEL



It keeps your cars in revenue producing service by giving a high mileage on one-wear.

**AMERICAN STEEL FOUNDRIES**  
NEW YORK CHICAGO ST. LOUIS



# Light Weight

Light weight cars are produced at the expense of car life if they are not built with more than ordinary care and of more than ordinary materials.

The Birney Light Weight One Man Safety Car produced by this company in its "Quality Shops" is maximum car value

St. Louis Car Co.  
St. Louis, Mo.





## A Business Center in Chicago in 1848

If ever there was a city whose growth has been a monument to the value of good transportation Chicago is "it."

In 1905 *fourteen per cent.* of all the railway mileage *in the world* terminated and centered in Chicago.

As early as 1897 Chicago had within its own limits nearly one thousand miles of street railways. To be exact, 957.82 miles. More than twice as much at the time as any other city in the world.

Think of the effect of this on Chicago's growth.

Look at its results as expressed in the appreciation of real estate values alone.

Before the railroads came to Chicago a lot at 144 Lake Street was sold for \$100. Twenty years later \$64,000 was refused for the same property.

The commerce of Chicago grew by leaps and bounds and this stupendous growth has been exactly coincident with the no less stupendous growth and improvement in methods of transportation.

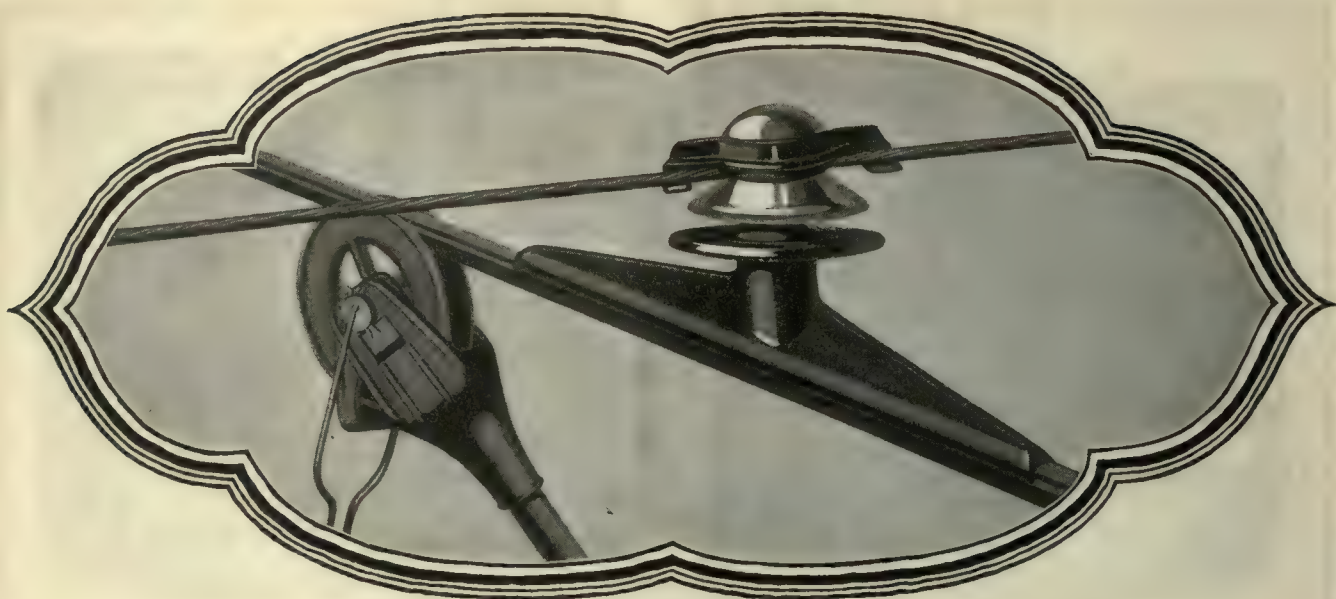
There is no effect without a cause. The moral holds in the case of

## Galena Oils and Galena Service

Cause—better results at no more cost. Effect—roundly ninety per cent. of the railway lubrication business of America.

**Galena-Signal Oil Co.**  
**Franklin, Pa.**





## No Solder Needed with Form Q Splicing Ears

A wrench is the only tool needed with this splicing ear. No solder is required and wires can be spliced quickly and securely in a very few minutes.

The groove depth approximates the diameter of the trolley wire so that, when the edges are peened down, there is a smooth, unbroken surface for the passage of the trolley wheel, as well as a snug fit for the wire. Ample strength is secured by reinforcing the casting at the bend without, however, interfering with the wheel clearance.

Cup set screws hold the wires in place while the upward curve of the dead ends further safeguard the wires from pulling loose.

The Form Q is a well-formed ear made from a *special composition* that insures long wear. Also, the speed and ease with which it may be installed recommends it to practical railway men.

Form Q ears can be obtained promptly from stock

**General**  **Electric**  
General Office **Company** Schenectady, N.Y.



# Electric Railway Journal

Consolidation of STREET RAILWAY JOURNAL and ELECTRIC RAILWAY REVIEW

Volume 53

New York, Saturday, March 29, 1919

Number 13

## How Glasgow Collects Its Fares

The third and concluding article on the Glasgow tramways, which we are publishing in this issue, will, we believe, prove to many readers the most interesting in the series, because it deals largely with the duties and pay of the employees and the method of checking and auditing the differential system of graded fares.

Perhaps the point which will impress the average railway reader first in this account is the difference in pay of platform employees in England and America. Thus, the motormen and conductors in Glasgow start in at slightly more than 25½ cents an hour and work up to about 29½ cents an hour at the end of seven years. The women employees, who constitute more than half of those who work on the platform, receive somewhat less because the men are more steady in showing up for duty and also because they expect to stay in the business. The women conductors start in at 14 cents an hour and work up to 22 cents an hour. The motresses earn about 1½ cents more an hour. These wages and the proportional lower rush-hour peaks undoubtedly account, to some extent at least, for the lower fares which are charged in Glasgow. Articles on other properties in Great Britain and Ireland will appear in early issues of this paper.

## Engineering Talent and Judgment Are Needed in Public Life

WHY has the engineer in general not taken the part in public life in which his talents and training fit him to be most widely useful? Some such question as this must have been in the minds of those who planned the conference on "The Engineer as a Citizen" which was held in New York City this week. Members of a dozen or more engineering societies of national standing participated in the conference, which was held for the purpose of securing constructive suggestions for the benefit of the several committees on development of these associations. The discussion was significant of the awakening conviction on the part of engineers that it is "up to them" to show how they can be more serviceable to the country. The war has helped them in this regard, for they were quick to seize the opportunity to place themselves at the disposal of the government when diplomatic relations with the then Central Empires were broken off, and they were given many opportunities and responsibilities in the preparations for and prosecution of the war.

The true engineer ought to be a useful citizen not only in doing first-class work in his profession but in applying engineering principles to the solution of civic problems. The same principles underlie both the technical and the general phases of the country's life, but undoubtedly in the past the engineers have been so

wrapped up in their own peculiar and fascinating problems that they have not given sufficient attention to the broader aspects of the situation. Other professions, notably the law, bring their members more naturally and prominently into the public eye than does engineering, and this also is a factor in bringing about the disproportion of engineers that exists. The engineer ought to be a good public servant because he is in the habit of dealing with realities rather than theories.

## Do Railway Companies Overlook Their Best Publicity Medium?

MANY thousands of dollars are spent annually in publicity. And provided the spending is placed under wise jurisdiction it would be well if many additional thousands were so spent. We believe in publicity. Give the public credit for some brains, tell them the facts straight to the point and keep them posted on all subjects in which they are interested and upon which they seek information.

However, things we say about ourselves do not carry the same weight as things said about us—whether they are good or bad, although in this case we refer to favorable statements. It was this thought which was back of a suggestion made at a recent electric railway convention that due to the natural antagonistic feeling of the public toward the railways, publicity advertising conducted by the large manufacturing companies would have more value in assisting the electric railways to combat the motor truck than would advertising issued by the railways themselves.

It is the same thought also which causes us to inquire whether electric railway companies do not often overlook their best publicity medium, namely, their employees. When the 6-cent fare went into effect in a certain city the railway company, pending a decision of the validity of the increase, gave a receipt for each extra cent. A certain man instructed all members of his family to refuse the receipts and to tell the conductor that the service was worth 6 cents. During the period the receipts were being given out, this man and his family did this about 200 times and in only three instances did the conductor show any appreciation, one conductor having thanked two members of the family.

This incident gave our investigative friend an idea, and he instructed all his plant managers to notify him by memorandum of each instance coming to their notice where an employee went out of his way to boost the company. From 1000 employees about two memoranda a week are received.

It would seem that in many instances the utility employees are being overlooked as instruments of propaganda to spread information about their company and to create a favorable public opinion. Actually, they are vitally interested in the prosperity of the company for



which they are working, and most of them realize it when the matter is brought to their attention, but most of them are not sufficiently well informed about the company's business to talk intelligently about it without seeming to be continually praising. If the company will take the trouble to supply them directly with the facts and so give them something to talk about, they will spread the propaganda among the public at large. Their influence will have more weight than a great deal of the advertising publicity often put out because they will be enthusiastic boosters without realizing it. Why not think it over?

### Facts Should Not Be Silently Disregarded

IN A RECENT editorial commenting upon the proposal of the Public Service Railway to establish a 5-cent charge for each first mile-zone and 1 cent per zone thereafter, the *Philadelphia Public Ledger* speaks in part as follows:

The Public Service Railway wants all the benefits of the old flat fare and an additional fare for long-distance riders besides. By making the initial unit 5 cents for the first zone-mile, the railway would inflict a double injustice upon its riders—a gross overcharge for the short rider and an undue burden on the suburban residents who have established homes on the outskirts of the city on the faith of low transportation charges to and from the business centers.

The *Public Ledger* usually has cogent arguments as the basis for its attitude of support or disfavor, but in the present instance its opposition seems to be merely that of begging the question.

We grant that there may be some justification for the statement that suburban residents founded their homes upon the "solid rock" of a 5-cent fare. There is a myth to this effect largely manufactured for the occasion by designing public leaders. Why do we assert this? In the first place, because, in the absence of a definite policy of city payment of railway deficits through taxation, most men are not foolish enough in these days to move into the suburbs with the hope of erecting a squatter's right to a 5-cent fare. In the second place, because the car-fare expenditure of even the average workman's family, according to authoritative statistics, is such a small portion of his annual budget that he seldom if ever considers this in deciding whether he can afford to pay suburban rents—which, by the way, are always high when car fares are low.

But we will pass over this point to the wholly unjustified premise of the *Public Ledger*, i.e., that the proposed fares in New Jersey will grossly overcharge short-haul riders and unduly burden long-haul riders. Such a statement without proof is not admissible. There is nothing new in the fundamental theory of the proposed fares; a "terminal" or "readiness-to-serve" or "stand-by" charge and a "consumption" or "movement" charge have been accepted by many courts and commissions for gas, water, electric light and steam railroad rates. The system has not yet been applied to electric railway rates, but such a fact does not prove it unfair.

As a matter of fact, it is interesting to note that in 1911 the Board of Public Utility Commissioners of New Jersey itself made the following statement in an electric railway case before it:

It would thus appear that a uniform basic rate or charge which permits, without additional charge, a ride of short but definite length might properly be accorded for a uni-

form basic fare, and that every mile or fraction thereof in excess should be paid for at a stipulated rate per mile. . . . Precisely what price should be charged for the basic part of the fare, and what rates per mile for the excess distance over the minimum ride covered by the basic fare, are practical questions which experience must determine, but that economic necessity will eventually establish such a fare seems as probable as it is necessary.

The proposal in theory is not unfair to either the short-haul or long-haul rider. Is it so in practice? This is a question of fact. The sole object of the plan is to make every rider pay for the amount of service used. Taking all its costs of operation, the Public Service Railway has apportioned them upon bases approved by leading commissions and public consultants, and it has arrived at a figure of 4.038 cents as the cost of standing ready to serve any passenger, no matter what his length of ride, and 0.99 cent as the additional cost of each mile of haulage.

The company has presented these figures for public scrutiny. If the *Public Ledger* can prove that a miscalculation has been made, it is welcome to do so, but it has no right to disregard the figures. It has fallen into error by jumping to the conclusion that a present stand-by cost of 4.038 cents cannot be correct because the old fare, providing for reasonable profit, was only 5 cents. Can it not realize that under operating conditions a few years ago the stand-by cost would have been say only 2 or 3 cents? It then did not cost 5 cents to carry the short-haul rider, but he was paying part of the fare of the suburbanite. Had the proposed system of fares been installed say in 1912, the fares for all concerned would undoubtedly have been less than they must be now, but that fact by no means proves their inequity now.

### Touching the High Spots in Maintenance Work

THE past two or three years have brought out previously unthought-of, or at least unrealized, schemes for cutting down maintenance costs. Last week's issue of this paper was taken up very largely with an account of some of the practices that have been evolved. The plan of the issue was not to produce a comprehensive text on the subject but rather to point out some of the places where worth-while savings are possible on almost any property.

At least three things stand out prominently as one studies the issue as a whole. First is the availability of concentrated heat, especially in the electric arc, the oxy-acetylene flame and the thermit reaction crucible. A new art has been created in this field and a national society was formed only this week to foster it. Electric railway track and equipment men will need to make the most of this art.

A second maintenance possibility is in timber preservation. Electric railways use an enormous quantity of wood; in ties, in bridges, in poles, in miscellaneous structural work. Heretofore the art of wood preservation has made some, but rather slow, progress. Conditions now favor much greater attention to prolonging the life of timber, and electric railway men are alive to the possibilities of conservation here.

A third point is the importance of inspection. Some time ago S. L. Foster wrote an article for this paper on the suggestive topic "Keep Up versus Pick Up." His argument, of course, was that it is more economical to maintain line work by means of watchful care than



by expensive emergency repairs. Inspection reveals the need for replacement or repair before the danger of interruption to service has developed.

There is one factor in maintenance also that has nothing to do with maintenance directly, namely, care in the selection of supplies in the first place. Inspection plays an important part here, especially as an adjunct to skillfully drawn specifications.

### This Is the Time For Action and Not Merely Words

**T**HE problem is not merely local or political, but of nation-wide business importance, and, if it is not fairly met, is capable of having a widespread and disastrous effect on business—an effect which every business interest, directly or indirectly, but inevitably, must share." In these words, Francis H. Sisson, vice-president Guaranty Trust Company of New York, at the mid-year meeting of the American Electric Railway Association, sounded the warning of impending cataclysm for the public utilities of the nation. And, as if to emphasize his warning, announcement was made within a week of the appointment of receivers for the New York Railways and its holding company, the Interborough Consolidated Corporation.

While these developments, like that affecting the Brooklyn Rapid Transit Company, are serious, they are by no means local in significance. A statement that more than one-tenth of the electric railway mileage in the United States is in the hands of receivers is ominous, but when we consider that practically every transportation company in the country is approaching the brink, the outlook is certainly most threatening. This can be illustrated no better than by study of a statement which is printed in the Financial and Corporate columns of this week's issue, reviewing a year's results on twelve of the largest railway properties in the United States.

The story told in those statistics, representing almost one-tenth of the mileage in the industry, is too plain to need much comment. It shows that the "big fellows" are governed by the same economic laws as the smaller properties. It is a sad commentary on the fairness of the public authorities that living rates have not been allowed and that only seven out of the twelve companies are permitted to charge more than a straight 5-cent fare. Data of this kind have a value for the executive. He can discover that his troubles are not peculiar to his own property and perhaps in studying the results elsewhere he may see the way in which his own situation can be improved. He should at least "get into the game" for co-operation.

An editorial in our Annual Statistical Number touched on the financial history of 1918 and the outlook for the current year. In that we said: "The concentration of trained minds on this problem is bound to find a solution in time." The recent gathering of leaders of the industry in New York proved that these executives, the bankers and the public authorities have not despaired of finding a solution. Many constructive suggestions were offered, and we have no doubt that good will result from them. As one of the speakers said: "There are manhood, brains and energy enough to pull the industry up the grade which it is now climbing. The situation is not hopeless. It is going to clear."

We quite agree with this view, even while facing such developments as those in New York. We insist, how-

ever, that all those who are interested in saving the situation must realize that the present is a time for action and not merely for optimistic words.

### Committee Work of the Two Railway Engineering Societies

**T**HE American Railway Engineering Association held its annual meeting in Chicago last week and the reports, while not so extensive as those prepared when the several committees were not working under the stress of war conditions, represented a great amount of work and progress. The results justified the decision of the association to continue committee activities during the war period. The handicaps arising from the war and particularly from governmental control of the railroads must have made committee work very difficult. The reports are the more creditable for this reason. They bring out the fact that the engineering departments of the two great divisions of the railway field have much in common. Electric railway men will benefit by much of this work performed by their brethren in the steam railroad field; hence several of the reports are abstracted in this issue.

Committee work of the American Electric Railway Engineering Association is under way again after a period of suspension and the assignments to the several committees are as listed last week in this paper. The work outlined is not unduly extensive. Our only criticism of the program is that the program is quite long, in view of the time available for committee work, and some of the topics assigned, while important, do not seem to be of a nature which require immediate solution because of war conditions. This situation can be helped by the committees in charge if they treat their topics in a way which will put "pep" into their reports. Some, at least, of the assigned subjects will allow this.

In addition to the topics assigned there are certain others which have assumed such special importance within the last year or two as to deserve consideration with respect to the possible need for the appointment of special committees to consider them. Among these are tie and timber preservation and corrugation of rails. The former is treated by the committee on wood preservation of the American Railway Engineering Association, while the latter has had special committee research in Great Britain. We believe that these are subjects of such moment as to warrant the appointment of special committees to study them for the benefit of the American Electric Railway Engineering Association. On subjects, like these, of mutual interest to the two railway engineering associations, it ought to be possible to co-operate and thus save duplication of effort.

We are pleased to note the automatic substation among the assignments for the A. E. R. E. A. committee on power generation. While it might better be considered as a power distribution matter the main thing is to bring out the salient operating features of automatic control. This will be a fine opportunity for men who have had actual experience in keeping automatics going to tell of their successes and their tribulations, if any, with the improvements made to overcome minor defects. No subject at the convention could arouse greater interest among the engineers unless possibly it is the application of welding to electric railway maintenance.



# The Zone Fare in Practice—Glasgow

BY WALTER JACKSON

This, the Concluding Article on Glasgow's Tramways, Considers the Standard Double-Deck Car, the Make-up of Schedules, the Hours and Rates of Pay of Transportation Employees and the Checking and Auditing of the Differential System of Graded Fares

## PART THREE

### *Cars, Schedule Making, Employees, Fare Accounting*

IT WILL be recalled that the first article on Glasgow brought out the fact that the housing and distribution of population of that city had not been adversely affected although the charge for transportation is based on the distance traveled, and the second article showed that Glasgow's combination of short headways and zone fares had encouraged most intensive street car riding. It is now in order to describe the tools with which this heavy traffic is handled, namely, the car and the traffic employees; and with these the control of the car movement through the schedule department and the handling of the car revenue through the receiving department. Perhaps, it is not out of order to point out here the difficulty of making conclusive parallels between British and American rates of fare, standards of riding and handling of the wage problem. Such parallels are particularly

difficult in the case of Glasgow, which is the only British system of importance that has not had to raise its fare during the war. Rates of fare for given distances must necessarily be higher in the United States because of higher operating costs. In the matter of riding standards, the American is likely to have a better upholstered car, but rougher track and longer waits to offset the faster running of the car. In the handling of employees, the better load curves obtained through the encouragement of mid-day riding, make it relatively easier for British roads to avoid the long hours that have made it so hard for our operators to hold their platform men despite higher wages. These differences in conditions will be brought out in some detail in the following paragraphs.

In accordance with the usual British practice, the

standard Glasgow car is of the double-deck type. As it seats sixty-two passengers and six more passengers are permitted to stand on the lower deck, this car may be said to have a right to the name "large." In fact, it is doubtful whether cars anywhere else come so close to carry their rated capacity for the greater part of

the day! The cars are fitted for train operation. They do not differ materially from those of a decade or more ago, except that first the principle of inclosing nearly all of the top deck was adopted and then the vestibuling of the platforms followed. At present, about one-half of the cars are vestibuled, this reconstruction having been interrupted by the war. They are of wood practically throughout, and, fully reconstructed weigh only 397 lb. per passenger. These cars, operated on an average schedule of 8.18 m.p.h. with possible stops spaced 600 ft.,



DOUBLE-DECK CAR, BEFORE ADDITION OF FRONT ROUTE-NUMBER SIGN AND WOODEN SIDE SIGNS

average 1.4 to 1.5 kw.-hr. per car-mile for the whole system, but careful motormen under test have actually made the same schedules with less than 1 kw.-hr. per car-mile.

Most of the cars are carried on Brill single trucks. The motor equipment comprises either two Westinghouse 49-B motors, rated at 30 hp. each, or two of the later Westinghouse 220 motors, rated at 35 to 40 hp. each. The controllers embody the electric braking features customary in British practice, but much more frequent use is made of the hand brake. Two sander mechanisms are provided, one is pedal operated, and the other electrically operated as a part of the electric brake when emergency conditions arise and a continuous flow of sand is desirable. Brake rigging is adjusted by hand.

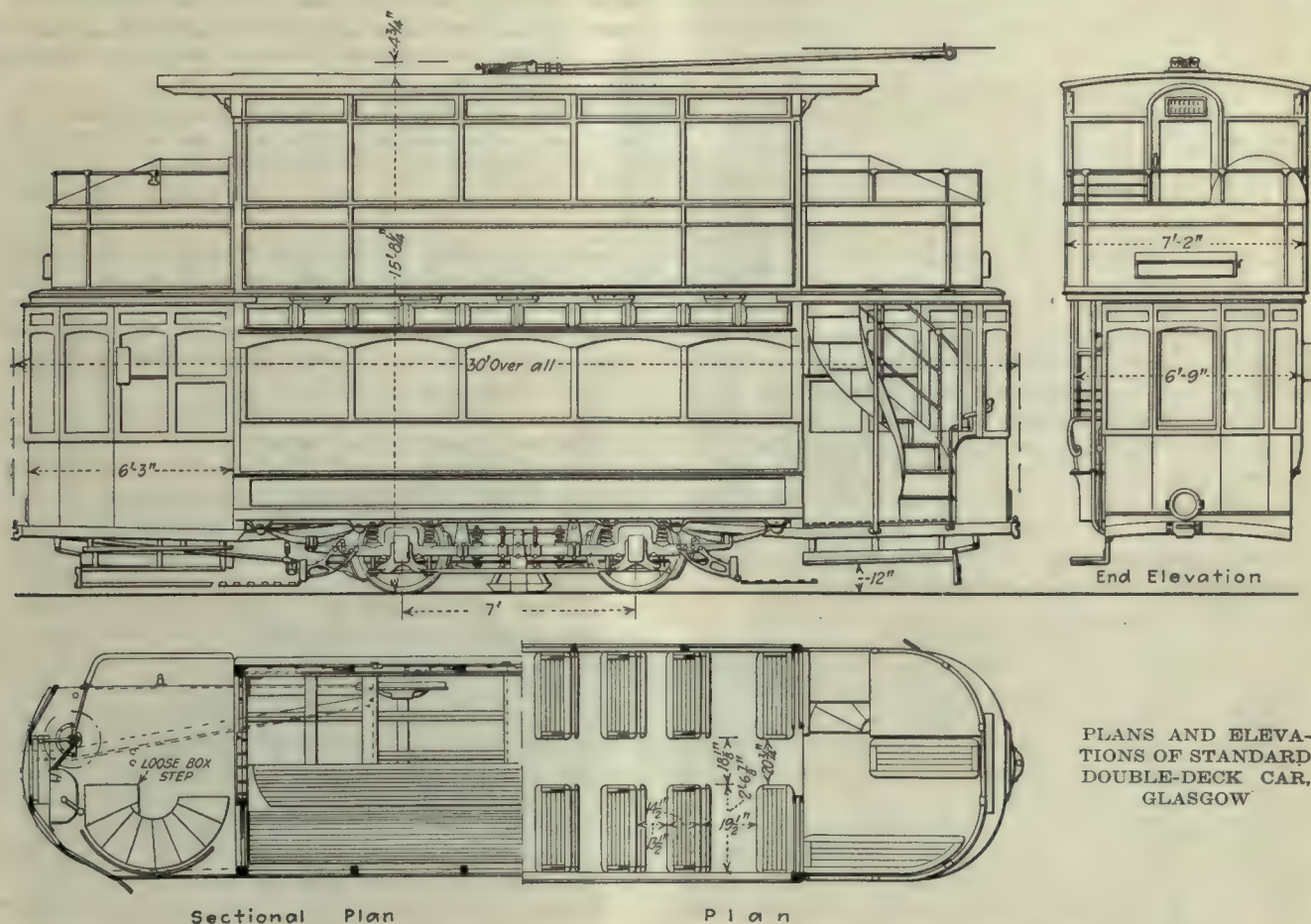
To avoid short-circuiting and burn-out troubles from



snow, the resistor grids are being transferred to a box on one of the platforms. On the other platform are cabinets for the solenoid and rheostat used in connection with the electrically-operated sander, for the main fuse and for the possible installation of a car-checking meter. The main circuits are carried in rubber hose, first under the platform from the controller leads, then inside the car under the longitudinal seating to outlets over the motor leads.

Owing to the lighting restrictions in force on account of fuel shortage, one of the three six-lamp (530-volt) circuits is still cut out. These lamps are rated at 25 cp.

are rarely equipped with central heating systems, and weather that would chill the pampered American to the bone leaves a Briton indifferent. In the Glasgow cars, only the sliding door in the front bulkhead on the lower deck is kept closed while the rear door on this deck is open almost all of the time. However, the passengers are at least spared the blowing in of rain or snow through monitor sash, as the air that comes in from outside through the louvers first enters perforated ducts. These side ducts are connected with longitudinal ducts running through the ceilings of both decks in such fashion as to expel bad air as well as to take in fresh



each. Of the eighteen lamps installed, one is installed on each of the four platforms and in each of the headlights. In each bulkhead is a lens or bull's-eye lamp, illuminated from inside the car by the nearest lamp, which has a slide arrangement to show red when used as a tail-light and whatever the route color may be when used as a destination marker.

The only other auxiliary circuit on these cars is that for the push buttons, dry batteries being used. These push buttons are installed in the bulkheads for operation by the conductors and at two or three places on each side within the car for operation by either passengers or conductors. The signals are of the single-stroke bell type. When the conductor is on the lower deck, the motorman waits for the usual two-bell signal; otherwise he is guided by his mirror.

One large item of operating expense which the Glasgow system is spared is that of car heating; nor does the public expect the cars to be heated. British homes

are rarely equipped with central heating systems, and weather that would chill the pampered American to the bone leaves a Briton indifferent.

When the first vestibules were installed it was found that the inclosure of one side did not prevent heavy drafts from coming down the stairway. It was necessary, therefore, to hood this stairway with a rolling shutter. The hood, incidentally prevents upper-deck passengers from trying to leave by way of the front platform.

The car interior is finished in American three-ply maple veneer. The lively appearance given by the variety of artistic car cards found in our cars is missing as the only advertising carried is of the non-revenue sort, such as notices to passengers and government war placards; nor is there any kind of advertisement on the outside of the cars—something entirely contrary to British tramway and bus practice.

Practically everything on the Glasgow cars, exclusive of the trucks and electrical equipment, is made by the



Route. <i>Riddrie or Alexandra Park and Paisley Road Toll</i>												
Time <i>Weekdays</i> <i>Spenninstown</i> - Depot												
Table Dated												
Run No.	Report at	WORK						Finish at	Time Worked		Rest	Spent Over
		Take No.	FROM		TO		Start of		Total			
			Time	Place	Time	Place				H M		
1	5 2	2	5 12	<i>Depot</i>	10 26	<i>Depot</i>	10 31	5 29				
		6	12 21	<i>Ala. Park</i>	5 51	<i>Ala. Park</i>	11 6	5 45	9 14	1 50	11 4	
2	11 58	11	5 8	<i>Depot</i>	9 29	<i>Ala. Park</i>		11 31				
	11 54	11	11 59	<i>Depot</i>	5 29	<i>Ala. Park</i>	2 14	3 50	8 21	2 25	10 14	
									17 35	4 15	21 50	
									9 17	2 8	10 55	
3	7 2	1	7 12	<i>Depot</i>	12 41	<i>Ala. Park</i>		5 39				
		14	5 29	<i>Ala. Park</i>	6 41	<i>Ala. Park</i>	6 56	5 27	9 6	2 48	11 54	
4	7 22	3	7 32	<i>Depot</i>	11 45	<i>Ala. Park</i>		11 23				
		6	5 51	<i>Ala. Park</i>	8 26	<i>Ala. Park</i>	8 41	11 50	9 13	4 6	13 19	

CARHOUSE RUN OR DUTY RUN, GLASGOW CORPORATION TRAMWAYS

Glasgow Corporation Tramways. This home manufacture extends even to the seats, which are of wood and much simpler in construction than American roads feel they have to provide for their passengers.

In concluding these notes on the rolling stock, it may be mentioned that cars are inspected two or three times a week; that armature clearances are gaged, oil cups filled and gear cases examined about every 4000 miles and that a general overhauling is carried out every twelve months in peace times, war conditions having extended this period to eighteen months.

#### SCHEDULE MAKING

In spite of the heavy traffic in Glasgow, no cars whatever are operated between midnight and 4 a.m., plans for owl-car service having been interrupted by the war. If the labor union plans of two or three shifts a day in industrial plants are carried out, the addition will be made.

The work of the crews is laid out upon the basis of a fifty-one hour week at regular pay with a permissible addition of three hours at time and one-half. These crews are divided into three classes: "W" men, the oldest, who get their runs early and who finish early; the extras or trippers who are assigned for the morning, noon and evening peaks or Saturday afternoons and

who get a full week's work; and, third, the most recent employees who finish early one week and late the following week. Individual choice of runs according to seniority is not practiced. As a matter of fact, this method is unnecessary in view of the easier hours. The runs are assigned directly by the chief time-table clerk according to the three classifications.

Two swings a day are usual, but no continuous assignment is desired to exceed six hours. Adherence to schedule is properly held to be a matter of prime importance. Motormen must take their time daily from the timekeepers and punch their time of arrival on Bundy time clocks. They also punch similar clocks just before reaching terminals and on their way back. Layovers average only two and one-half minutes, which is not surprising in view of the short headways and the use of cross-overs.

For the guidance of the motormen who handle the same car in the course of the day, the time-table department prepares an individual time-point form, which shows when the car is due to pass certain important places on its route. One of these forms is pasted on a board, varnished over for preservation and then hung in the vestibule of the car to which it applies. Thus every car carries its individual schedule. Copies of these individual schedules are retained by the time-table department in a master record book so that duplicates, in case of loss, can be made at once.

A typical run or duty-sheet, which the men at a given car station consult before beginning their day's work, is reproduced on this page. The reporting time is ten minutes in advance of the taking out of the car and this period counts as part of actual working time. Allowance is also made for time needed to make out daily reports.

In this particular instance, the man at the head of the list has one straight tour of five hours twenty-nine minutes, a relief of one hour fifty minutes and a second swing of three hours forty-five minutes, giving nine hours fourteen minutes working time within eleven hours and four minutes. In general, the longest total working period is nine hours thirteen minutes and the longest spread, thirteen hours nineteen minutes. Hence, even under the better conditions afforded by better load factor and absence of owl service, the Glasgow Corporation Tramways would be hard put to it to obey the Massachusetts nine-hour-in-eleven law!

Another blank reproduced is the "cycle of duties" sheet, which is made up for every depot to show each man's work for the whole week in order to take care of days off. It is customary for every platform employee

### GLASGOW CORPORATION TRAMWAYS.

#### CYCLE OF DUTIES.

Route. <u>Riddrie or Alexandra Park and Paisley Rd Toll</u>																													
<u>Spenninstown</u> Depot.																													
Date. <u>13<sup>th</sup> May 1914</u>																													
Cycle No.	SUNDAY			Day's Work Hrs. Mins.	MONDAY			Day's Work Hrs. Mins.	TUESDAY			Day's Work Hrs. Mins.	WEDNESDAY			Day's Work Hrs. Mins.	THURSDAY			Day's Work Hrs. Mins.	FRIDAY			Day's Work Hrs. Mins.	SATURDAY			Day's Work Hrs. Mins.	Total Week's Work Hrs. Mins.
	Duty No.	Report	Finish		Duty No.	Report	Finish		Duty No.	Report	Finish		Duty No.	Report	Finish		Duty No.	Report	Finish		Duty No.	Report	Finish		Duty No.	Report	Finish		
<sup>W</sup> 1	Day Off				<sup>W</sup> 1	5 2	4 6	9 14	<sup>W</sup> 1				<sup>W</sup> 1				<sup>W</sup> 1				<sup>W</sup> 1				<sup>W</sup> 1	5 2	3 02	9 23	54 6
<sup>W</sup> 2	2	9 54	8 32	8 08	2	4 58	8 44	8 21	Day Off			<sup>W</sup> 2	2				<sup>W</sup> 2				<sup>W</sup> 2				<sup>W</sup> 2	4 58	6 52	7 36	52 58
3	Day Off				11	12 16	12 2	9 6	11				11				11				11				13	1 26	12 4	9 1	54 81
4	8	11 4	10 44	9 13	Day Off				5	4 40	4 46	9 1	5				5				5				4	4 9	7 24	9 4	54 21
5	4	11 16	10 24	9 23	4	9 44	9 15	9 1	Day Off				4				4				4				14	12 4	12 11	9 09	54 26
6	Day Off				12	12 14	12 4	8 55	13				13				13				13				12	11 0	12 5	9 23	52 8

CYCLE OF DUTIES SHEET FOR A GIVEN CARHOUSE SHOWING ASSIGNMENTS FROM WEEK TO WEEK



to have one day off weekly, the arrangement calling for Sunday off one week and some other day off during the following week. This cycle sheet shows at a glance also whether every man is getting within the fifty-four-hour maximum and whether at least nine hours has been allowed between his runs on successive days.

#### TRAINING AND RATES OF PAY FOR TRANSPORTATION PERSONNEL

It is hardly necessary to say that the tremendous sacrifices of man-power which Great Britain has had to make in the Great War sadly upset its labor conditions and nowhere more so than on the street railways. What facts could tell more in a few words than this: Out of 3234 platform employees in service on Dec. 21, 1918, about 1800 were women—1500 acting as conductresses and 300 as motresses. A group of women conductors standing by a car is published on this page. Such figures imply an enormous change from the condition obtaining at the close of the fiscal year ending May 31, 1913, when it was reported that out of 2905 employees only 540 had resigned. The four classes of front-end operators instructed

bonus of 3d. for every day they have a student. To become a full-fledged motorman the indorsement of the instructor and the motor inspector is necessary.

That the zone-fare system cannot be very complicated as carried out at Glasgow would appear from the short period allowed for the training of conductors—one day in the classroom and seven days on the car under an instructor. The lesson in the classroom is carried out by assuming that the students are passengers. Each one comes out in turn to collect fare, make change, punch tickets, give signals and perform the other functions of the job. The students are taught to collect fares from the front of the car when on the lower deck, but to face forward on the upper deck in order to prevent passengers from departing without paying.

At the end of the eighth day, the student is due for indorsement by the instructor conductor, the depot clerk and the local ticket inspector. If the inspector thinks the student is not ready for service, he may recommend either dropping the student or an extension of the instruction period. The same form carries the student's signed acknowledgment that he has been taught correctly according to the rules.



A GROUP OF GLASGOW CONDUCTRESSES, WITH ENLARGED INSERT AT CENTER, TO SHOW MANNER OF CANCELING TICKET IN THE BELL PUNCH AND COUNTER

during December, 1918, and the week previous thereto were the first womanless classes handled in a long time, and it is hoped that the progress of demobilization will make the employment of more motresses unnecessary.

The instruction of motormen or motresses, who must come from the rear platform, comprises three days in school, four days with a platform instructor, one day return to school for a preliminary examination, three days more with the platform instructor and then return to school on the twelfth day for the final examination. Upon this follows a probationary period of thirty days. The students are on their full pay during the entire period. The instructor motormen receive a

The conductors who teach students also receive a daily bonus of 3d. The probationary period is three months, during which the student is paid 30s. (\$6.90) a week, at the exchange rate of \$4.60 to the pound sterling, which is the rate assumed in the following calculations.

All platform employees receive their uniforms and operating equipment, such as the bag and punch of the conductors, without charge and subject to return upon resignation. No surety bonds are demanded from either class of platform workers. All that applicants for employment need do is to refer to two previous employers and one other person of proved character.

On entering the service, each platform employee is



provided with a rule book containing instructions for both motormen and conductors, a list of telephones for emergency use, instructions for ticket inspectors and depot clerks, the corporation by-laws governing the conduct of passengers, various enactments relating to tramway construction and operation and an alphabetical list of streets, squares, places, etc. Transportation employees are also furnished with a handbook showing routes, stops, first and last cars, places of interest and importance, etc., so that they can give intelligent answers to almost any traffic inquiry.

A distinction is made in the rates of pay according to sex because the men are more steady in showing up for duty and also because they expect to stay in the business. Quite a number of the women are satisfied to work but five days instead of six. Motresses and conductresses are on the following scale of wages:

Original Rate	Per Week	War Bonus	Present Rate Fifty-one-Hr. Week	Total Earnings Fifty-four-Hr. Week
First three months	29s.	1s.	30s.	32s. 7d.
Thereafter	47s.	...	47s.	51s. 2d.

The extra three hours in the fifty-four-hour week are at overtime rates.  
Motresses are allowed an additional 6d. per diem, and their total earnings amount to 35s. 7d. (\$8.19) and 54s. 2d. (\$12.46), respectively.

The scale of wages for motormen and conductors follows:

	Pre-War Rates per Week	War Advances	Present Rate Fifty-one-Hr. Week	Total Earnings Fifty-four-Hr. Week
First year	27s.	28s. 6d.	55s. 6d.	60s. 5d.
Second year, first six months	28s.	28s. 6d.	56s. 6d.	61s. 6d.
Second year, second six months	29s.	28s. 6d.	57s. 6d.	62s. 7d.
Third year, first six months	31s.	28s. 6d.	59s. 6d.	64s. 9d.
Third year, second six months	32s.	28s. 6d.	60s. 6d.	65s. 10d.
Fourth year	33s.	28s. 6d.	61s. 6d.	66s. 11d.
Fifth year	34s.	28s. 6d.	62s. 6d.	68s.
Sixth year	34s.	28s. 6d.	62s. 6d.	68s.
Seventh year	34s.	28s. 6d.	62s. 6d.	68s.
Thereafter	35s.	28s. 6d.	63s. 6d.	69s. 1d.

From the foregoing table it will be seen that all grades of platform men received a total war advance of \$6.55 weekly, which is more than equal to the original starting wage of \$6.21. The maximum wage today is \$15.89 per week.

A bonus of 26s. (\$5.98) or at the rate of 1s. a week is paid every six months to platform employees who have incurred no accidents. All classes of transportation employees also receive six days vacation per annum with pay.

#### DUTIES AND PAY OF PETTY OFFICERS

At Glasgow, the uniformed supervisory force is differentiated into ticket inspectors and timekeepers, 100 in all for 3234 platform employees. Of this number, thirty-six act as timekeepers and fifty-four as ticket inspectors. About ten plain-clothes men, who are conductors on special service, are also employed to report on violations of speed ordinances by other vehicles, to watch for ride-stealing boys, etc. There is no secret service.

The chief duty of the ticket inspector, as the name indicates, is to examine the tickets of passengers on the cars to ascertain if the proper fares have been paid and the tickets issued and punched correctly. On boarding a car, they require the conductor to produce his waybill (trip sheet) and the working packet of tickets in use in order that they may check the passengers' tickets. If a passenger refuses to show his

ticket or to pay the proper fare, it is sufficient to secure his name and address for a report to the general manager; but if the passenger refuses even this information, the police may be called. Ticket inspectors must also report every case of a passenger who has paid a fare being without a ticket, or having an unpunched or improperly punched ticket, or having a ticket the number of which does not correspond with the fare paid or the waybill. This report must be accompanied by the name and address of the passenger and of any witnesses of the occurrence.

The miscellaneous duties of ticket inspectors include reports on the efficiency shown by instructor conductors, on reckless car operation and on failures to adhere to time points, and the inspectors are expected to telephone at once concerning accidents, fires, damage to car, track and line, etc. In general, the ticket inspectors are authorized to enforce proper operation, car cleanliness, and the like. If necessary, they may suspend (but not discharge) any motorman, conductor or outside traffic employee in case of insubordination, drunkenness, neglect of duty or other improper conduct, reporting the facts in writing to the general manager.

The chief duty of the timekeepers is to see that the cars are run according to schedule. These men are generally stationed at crew relief points where they note the on and off times of departing and arriving platform employees. At depots, crews must report ten minutes before the time of taking out the car, but at junctions and other relief points they are expected simply to be on time for their cars. The place at which every car employee first reports for duty is at a depot. Timekeepers may use their discretion in asking the depots for substitutes for absentees.

Both the ticket inspectors and timekeepers receive more pay than the ranks from which they come. During the first year they are on probation at their old platform pay. Their days off, vacation, etc., are planned as in the case of platform employees; in addition, no time is deducted for illness. No better instance of the effect of the war on wages could be afforded than the following comparison of the pre-war and present wages of the supervisory officers:

TICKET AND MOTORMEN (STREET) INSPECTORS		
First year from 35s. to 70s.	...	\$8.05 to \$16.10
Second year from 37s. to 72s.	...	8.51 to 16.56
Third year from 39s. to 74s.	...	8.97 to 17.02
Fourth year from 41s. to 76s.	...	9.43 to 17.48
Fifth year from 43s. to 78s.	...	9.89 to 17.94
Thereafter from 45s. to 80s.	...	10.35 to 18.40
TIMEKEEPERS OR TRAFFIC REGULATORS		
First year from 35s. to 70s.	...	\$8.05 to \$16.10
Second year from 36s. to 71s.	...	8.28 to 16.33
Third year from 37s. to 72s.	...	8.51 to 16.56
Fourth year from 38s. to 73s.	...	8.74 to 16.79
Fifth year from 39s. to 74s.	...	8.97 to 17.02
Sixth year from 40s. to 75s.	...	9.20 to 17.25
Thereafter from 42s. to 77s.	...	9.66 to 17.71

Thus Glasgow's war wages are about the same as America's pre-war wages.

#### AUDITING OF ZONE FARES FROM CONDUCTOR TO TREASURY

Every conductor begins the day's work with packets of the serially-numbered fare receipts applicable to his route. These receipts are obtained from the depot clerk. The tickets of each classification are made up in pads of twenty-five or fifty and bear an initialing identification in addition to the colors and numbers.







week is admissible. Discrepancies between the registration shown by the punch and the number of tickets issued generally are due to failure to punch every ticket as issued. A difference in excess of 6 means the counting of the punchings. This is a tedious job since it is necessary to assort more than 1000 punchings of different colors, a separate shade being used for each rate of fare. In ordinary times, it is necessary to make checks of this kind from thirty-five to fifty times a day; at the present time, however, the figure is about 50 per cent greater because of the large number of inexperienced conductresses.

As soon as shorts have been entered, the original waybills containing the notation of error are returned to the conductor's depot for his signed acknowledgment. On going back to the receiving department, entry is made in the "shorts" ledger and the waybills are filed for a time for reference in case of dispute. The final blank reproduced shows a more elaborate form which must be filled out by conductors whose reports are grossly incorrect or who have failed to turn in their cash and ticket-handling equipment at the end of the day.

Overs are not returned to the conductors. Formerly they were divided among the men at the end of the year; now they go directly into their benefit organization known as the Friendly Society.

Should a conductor catch himself issuing a higher-rate ticket by mistake, he may turn it in for credit provided he gives the name and address of the passenger affected. In any event, if he retains the wrongly-issued ticket, he must issue another one of the correct denomination since every passenger must have a receipt. Occurrences of this kind are rare. He may also put aside and turn in any ticket which is too thick for the bell punch.

#### SIZE OF STAFF REQUIRED

The personnel employed by the receiving department in connection with the auditing of cash and tickets comprises 131 women or girls classified as follows: Cash room, ten; outside cash offices, thirty-eight; ticket room, sixty-eight; traffic sheets, nine, and punches, six. All counting and checking are done by hand, the management having found that the individual amounts handled are too small to justify the use of calculating machines. It is probable, nevertheless, that a decimal coinage would simplify the work, judging by the fact that the clerks may be seen referring to calculating tables.

The returns from the depot clerks and cash clerks go to the receiving department in locked cases which are fitted with compartments for copper, silver, punches, waybills, etc. Delivery is made in motor trucks twice a day.

The fare receipts used at Glasgow are printed by the Glasgow Numerical Ticket & Check Book Printing Company. The Tramway purchased 430,946,566 tickets for the fiscal year ended May 31, 1918, of which 2,877,300 were scrapped. The punches are leased from the Bell Punch & Printing Company, London. As no work is done at the receiving department on Sundays, it is necessary to have at least two punches per conductor since the punchings chamber cannot hold more than 2000 cuttings comfortably.

From the foregoing account, it will be seen that the handling of fare receipts in Glasgow is a comparatively simple affair, especially as there are no transfer tickets

to complicate the situation. Furthermore, the checking up of the fare receipts is far easier than the checking of the time limit and other features of the American transfer.

#### Women Conductors in Chile

THE electric railway companies of Valparaiso, Chile, found it possible to employ women as conductors on the railway cars of that city long before they were so employed in the United States. For that reason the accompanying photograph, which has been loaned to the Washington correspondent of this paper by the Pan-American Union, will perhaps prove of interest.



WOMAN CONDUCTOR AT VALPARAISO

This view was taken almost ten years ago, it is stated at the Pan-American Union in Washington, with the additional remark that the picture holds good for to-day, even to the fact, it is declared, that the women conductors go about their work in voluminous skirts rather than the shorter ones used by the women conductors in the United States, although, as women's fashions in Valparaiso change as frequently as they do in other communities, there is a possibility that the skirts worn by the conductors in Chile now are not quite so voluminous as those shown in the picture.

#### Conservation of Fuel by "Daylight Saving"

Because of the fact that the clocks of this country will be moved forward one hour at 2 o'clock to-morrow morning March 30, in compliance with the "Daylight Saving" law, the statement by the United States Fuel Administration is interesting that it estimates 1,250,000 tons of coal were saved during seven months last year through the operation of this law.



# How the Public Feels About It

Representative Public Leaders of Various Classes Give in Replies to Questionnaire Their Opinions Regarding Guarantee of Return, Aid Through Taxation, Municipal Versus State Ownership, and Indeterminate Franchises

**R**ECENTLY the ELECTRIC RAILWAY JOURNAL, it will be recalled, sent out a questionnaire to more than 400 public service commissioners, mayors, representatives of chambers of commerce and other leaders interested in municipal affairs. The desire was to secure helpful expressions of public opinion in regard to the electric railway situation.

Although only about 15 per cent of the total mailing list replied, it was possible in the issue of Feb. 22 to present a striking summary showing that the difficulties encountered by electric lines in trying to secure higher fares were due generally to the lack of public understanding, politics, defects in the regulatory system, and utility sins of omission and commission.

Similarly, in the issue of March 1, it was possible to give a résumé of what to the various public representatives seemed constructive suggestions for overcoming the above-mentioned difficulties. It seemed to be the consensus of opinion that the railways can convince the public of their needs by frankly stating all the facts, subject perhaps to public verification, asking only for a fair return on a reasonable investment and winning the public confidence through efficient and adequate service and a manifest desire to please.

These two summaries covered the replies to about two-thirds of the questionnaire. The replies to the remaining queries will be summarized in this concluding article. In advance of a statement of the questions and answers, it may be remarked that the third section of the questionnaire covered certain moot points of franchise construction, municipal ownership and railway economics, and the constructive suggestions resulting were somewhat limited because of the complexity of the subject matter.

The several questions and a brief analysis of the replies follow:

*Can the franchise relationship fairly be made to provide a guaranteed return upon the invested capital, and if so, should this return be fixed at a uniform percentage throughout the life of the franchise or should the return on the portion of the investment made in any particular period be made to vary according to the circumstances of that time?*

The replies to the first part of this question were both favorable and unfavorable, but the supporters of a guaranteed return seemed to have slightly the better of the argument. In the advocacy of a guaranteed return, however, there was in some cases the reservation that public representation in control was a necessary adjunct.

As for the second part of the question, those who met the issue squarely seemed inclined, in the case of the commissioners and civicists, to recognize the advisability of a flexible rate of return so that the current market rate for new money invested in any particular period might be met. The mayors and representatives of chambers of commerce, however, favored to a small degree a fixed return to avoid "confusion" and "disagreement." One business man averred that this policy

would check extensions in periods of high costs and encourage them in periods of low costs, "thus resulting in the good of both the public and the company."

Some of the more detailed replies are published below:

## COMMISSIONERS

If possible, the franchise should provide for a guaranteed minimum rate of return on the property value to be fixed or ascertained yearly or at stated intervals.

A fair return should be guaranteed or provided, but in a great crisis like the one just gone through, the public should not be required to bear all the burden. The utility should stand its share in the lean years, having enjoyed the advantage in the fatter ones.

It would be very difficult, for traffic costs and other elements are fluctuating. A fixed rate of fare sufficient to provide an operating surplus to be held in trust for the preservation and continuance of the service is a reasonable suggestion.

Under commission regulation the franchise granted by a municipality should contain no provision as to rates or return upon the investment.

A guaranteed rate of return can fairly be provided upon stockholders' capital, subject to adjustment every ten years in harmony with prevailing interest rates on prime securities.

A guaranteed return is feasible and desirable under a cooperative plan of operation, but with the necessary proviso that capital expenditures cannot be made without approval of standards and extent of track, equipment, etc., and that the public shall not be financially responsible for obsolescence due to changes or improvements in the art of transportation.

The return should not be fixed as a uniform percentage throughout the life of the franchise, but it should be made to vary according to the circumstances of the time.

I do not favor a guaranteed return as a general legislative policy, but I do believe that the basis of the return should be made a definite matter. It should be clear in any case what the investors are entitled to receive, and the rates should be such as to give full opportunity to obtain a fair return, but the risk of getting the business in most cases would probably better remain with the companies.

The rate of return on the investment in any period should vary according to the conditions of that period.

The rate of return should be uniform, as indicated by average over many years. But the fare should be flexible to maintain the fixed rate of return plus a reasonable surplus in prosperous years, to meet cost changes.

## MAYORS

The new ordinance in this city provides for a fixed return on the investment with an additional return as fares are reduced as an incentive to economical management.

The rate of return should vary according to circumstances. A fixed percentage would be preferable, as it would remove an additional point of contention.

No guaranteed return should be thought of unless the public receives a representation in the management.

## REPRESENTATIVES OF CHAMBERS OF COMMERCE

To be perfectly fair, the rate of return should vary with the interest rate.

I believe that the first point is to obtain the actual, liberal fair value of the property without regard to capitalization; allow the company a fixed percentage (about 8 per cent) on this as return on investment. Capital expenditures after that should be added to the fixed valuation and the same percentage paid. There should be an elastic fare but no guarantee by the public treasury. Service and capital expenses should be controlled by the municipal government, through a department with an administrator paid by the city.

The return should be guaranteed at a uniform percentage



in order that capital may be willing to help finance such properties.

The nearest thing I have heard toward a fair solution is the proposal to fix a definite rate of return to the stockholders, the earnings beyond that point to be divided between the stockholders and the city. Franchises to be drawn up in the future will have to carry a large element of public control in order to enjoy any popularity among the laboring classes.

The rate of return should be agreed on in the franchise. Any other plan would lead to uncertainty, confusion and possible juggling.

The return can fairly be guaranteed, and it should be made a uniform percentage on the investment during the term of the franchise. A varying return subject to the changes of the general economic status would result in disagreements. While this might be regarded as an arbitrary rule, yet it would check extensions during periods of high costs and encourage them during periods of low costs, thereby resulting in the good of both the public and the company.

The franchise relationship can and should be made to provide a guaranteed return upon invested capital, and at a rate to correspond to that obtainable in comparable enterprises at the time of the investment or adjustment. This may be adjusted from time to time as conditions vary, or as security issues are refunded.

The franchise should be sufficiently elastic to provide reasonable investment return under all circumstances. These hard and fast bargains, in which one or the other suffers, are not desirable. They breed trouble all the time.

#### CIVICISTS

It is, of course, logical that the state which attempts to limit the return to a maximum should protect the investor by guaranteeing a minimum, but I do not believe that this is practicable. If adopted, the return should be uniform.

The return of investment made should vary according to the circumstances of the time.

If the government is going to guarantee a return it should control and direct operation.

The return must be capable of responding to market conditions. There should be no artificial terms in an arrangement.

*To what extent, if at all, would social politics justify the support of electric railway service in communities by some contribution through the taxation power of the state?*

It is difficult to determine the relative weights of the varying sorts of replies to this question. The trend of thought underlying them all, however, seems to run in this way. It has generally been believed to be theoretically just for the car rider to support the service, and the idea of support through taxation is one up to which the public is not educated, although its proponents are apparently growing.

If for any vital reason, such as the necessity of preventing city congestion or curtailment or suspension of service, public aid through taxation is necessitated as a practical last-resort matter, whatever the theoretical justice of the procedure may be, the public is likely, several replies assert, to insist upon closer union with the utility, even to the extent of ownership of the property.

Various specimen replies follow:

#### COMMISSIONERS

Tax payers would perhaps properly say that if the state or municipality is going to support public utilities, it would better own them. Public ownership would probably follow efforts to secure tax aid.

Inasmuch as the utilities are publicly controlled and the man who has his money invested has little to say about his own business, the guarantee plan through taxation would seem to be just, but I doubt whether public sentiment has been sufficiently educated up to that.

It has not dawned on the social political mind of the middle west that utility service should be supported by taxation. There is still lurking the other idea—that such companies should contribute to the public fund through franchise taxes, taxes on earnings, paving repairs, etc.

The rates charged by a utility should be sufficient to support it without resort to taxation.

Any actual deficit under a 5-cent fare should be made good from a tax on land values only.

With a guaranteed return I favor support thereof by taxation of all property instead of the entire burden being placed on the traveling public. Every form of property benefits directly or indirectly by these necessary public facilities and should therefore pay its share.

Yes, with substantial public control—not merely regulation subject to court review.

In some cases, in order to prevent undue congestion of population, the cost of service may very well be made up by taxation. But that should not be fixed by general policy but left to local settlement.

Such a policy would be unfair to the taxpayer who makes no use of the electric railway. The users should pay such a price for the use as to give the company a fair return upon its investment or the property should be scrapped.

If there is any valid strong social reason for any kind of preferential rates, such as labor tickets, school tickets, etc., the difference in fair cost of that special service over receipts should be paid out of tax funds rather than loaded onto the other fare payers, who may not be represented in the same proportion as they pay fares. School tickets at low rates are a social necessity.

#### MAYORS

Support through taxation is justified to prevent congestion of population where a 5-cent fare must be maintained to assure a movement of population to the outskirts of the city.

Municipal ownership either with or without municipal operation would be preferable if resort must be made to direct taxation.

Under existing conditions, the policy of aid through taxation would be indefensible and totally without funds to support it.

There is no justification for support of electric railway service by contribution from state taxes—any more than there would be in the case of newspapers, gas and electric utilities or express companies. It is true that state highways are partly maintained by general taxation, but the time is coming when the vehicle tax will bear the whole cost.

Aid through taxation is justified to an extent large enough to encourage riding—to make electric railways practically moving sidewalks.

Every public utility should stand on its own feet.

#### REPRESENTATIVES OF CHAMBERS OF COMMERCE

Let those who use utility service pay a just amount for it. Real estate is taxed enough now.

Taxes are high now, and car riders should pay enough to support the roads. State support to the electric lines would open a door through which other privately-owned public service corporations might want to crowd in.

If after thorough examination reasonable cause is shown for community aid, it should be done only when expenditures are controlled by a public official directly responsible to the people.

Public opinion is not ready for this yet. Many people still think public utility operation should yield a profit to the city so as to reduce taxes.

Electric railway service is essential to every community of any consequence, and if private capital unaided cannot be enlisted, then the community would be justified in guaranteeing the deficit from operation and interest on the investment by a general tax levy.

In communities badly needing transportation, the grant of aid would be a local proposition, as through subscription to bonds, capital stock, etc., by individuals.

Electric railways should be self-supported as far as financial support is concerned. Possibly concessions should be made in public works benefits.

Aid through taxation should be granted only on condition that the company make an entirely new contract with the community.

#### CIVICISTS

The taxing power of the state should not be used to support industries which render variable service to individual citizens.

We may have to come to some arrangement for public subsidies. I do not feel sure that the public ever will be educated to pay more than 5 cents, but with the shrinking



power of the dollar the public may finally look on the dime as they formerly looked upon the nickel.

If the state or cities took over the utilities, there is no question but that general taxes would have to aid in maintaining the utilities, but the people would be in favor of this as long as they owned the roads.

No general rule is possible. If this question is answered in the affirmative, the government should operate the railway.

Aid should be granted through taxation only to the extent that the public adequately participates in the management and in the results of joint investment.

This is entirely a matter of local policy and should be attempted only after every practicable device to develop higher load factors and subordinate sources of revenue have been used.

Free transportation would be as reasonable and as civilizing an agency as free education.

*To what extent, if at all, should the car riders in a large municipality support non-paying service to suburban communities?*

Several of the replies to this question favored the idea that all railway service to suburban communities should be self-supporting. The majority, however, seemed inclined toward the belief that a limited part of the burden of non-paying suburban lines should be borne by the urban car riders in order to foster suburban development and thus promote the general community welfare. Several urged the desirability of having suburban real estate bear a larger part of the burden than it now does.

Some of the detailed replies follow:

#### COMMISSIONERS

For a reasonable period pending the development of new districts, all patrons of all transportation lines should bear a share of development costs. The company should be allowed to amortize a share. Many unprofitable extensions and new lines are built to develop tracks of land, in which event the land men should aid or guarantee.

This is inevitable in the building of a city and is not contrary to good government or regulation.

The urban car riders should support suburban service only to such an extent as to prevent prohibitive or unreasonable suburban fares upon lines reasonably demanded by the general welfare of the locality served. No fixed rule any more specific could be made to fit all cases.

For the general public interest a utility should expect to maintain non-paying service to a limited extent, and the loss would have to be made up by the remainder of the system.

None whatever. A tax on land values of the entire zone should be provided.

The property of all communities served should pay its share, and likewise the traveling public should pay in proportion to the service rendered to all suburban additions and towns outside of reasonably defined city limits.

About 15 per cent.

Each service should be self-supporting.

It is undoubtedly an advantage sociably to encourage means which reduce crowded living conditions, but this may be carried so far as to mean an uneconomic, wasteful scattering of the population. Low car fares mean almost always higher prices for outlying real estate, so that what the city community pays in carrying low-priced transportation to outlying districts really goes wholly into speculators' pockets. A fare proportioned to cost of service for each reasonably-sized zone seems the logical one.

#### MAYORS

Only to prevent congestion of population.

Theoretically they should support it, but actually they would not knowingly tolerate it. The public knows that companies in the past have built on to "boom" additions, in consideration of a bonus paid by the land company.

The burden should be put on the real estate benefited.

All lines are parts of one system, and no part can be segregated and its profits or losses separately determined.

A city should bear the burden of a system giving service to suburban districts. In no other way can such districts obtain good service. How far this principle should apply is a question.

A city should support suburban service only to the extent that it benefits therefrom.

It depends entirely on the suburban buying power.

#### REPRESENTATIVES OF CHAMBERS OF COMMERCE

Urban car riders should not be called upon to support non-paying suburban service, but the railway might ask for assistance in building the lines from the new communities served and from the larger merchants, etc., in the populous center.

Give the suburbs a zone system by which they will pay for what they get. This might delay development of the suburbs, but it seems the only fair way.

The fares paid in the entire municipality should be sufficiently high to pay a just return on the investment on the entire system, taking into account both the paying and the non-paying divisions when operated as one enterprise.

City riders should not support non-paying suburban routes. This loss could be remedied, perhaps, by curtailed service or increased rates to suburbs.

Suburban fares outside city limits can and should be regulated on the zone or mileage system.

Except for unreasonable distances, the fare should be exactly the same in the suburbs as in the crowded sections.

While the municipality may be benefited by ready transportation service to its suburban communities, it is also true that the suburbs are as much beholden to the center municipality. Their interests and benefits are reciprocal and, with the exception of specific cases, each should pay its own way.

Practically not at all. The dweller outside of the municipality chooses that residence to avoid taxation and other burdens of city residence, and he should properly pay a higher rate of car fare.

#### CIVICISTS

Theoretically, not at all; practically, I see no way to avoid it.

At the present time we permit real estate speculators to take off the cream of real estate values created by the extension of electric railway lines to the suburbs. It would seem that some method should be devised for making the land owners directly benefited pay for these extensions. The principle of special assessment ought to be applied here. If this were done, there would not be much of a problem left.

It frequently would be advantageous to a community to provide suburban service for the sake of promoting business, facilitating the accommodation of workers and laying the basis for urban development. The question so much depends upon local conditions that I do not believe it is susceptible of any general answer.

I believe there is much to be hoped for from a zone system of fares for large cities. It is logical and wholesome.

It would not be necessary for city car riders to support suburban service if the municipality had the power to collect the unearned investment on the property values created by improved transportation.

*Is it necessary that, in any new relationship between electric railways and the communities they serve, provision be made for public ownership at the option of the public?*

Although a good many of the respondents felt constrained to avow their disapproval of municipal ownership, they and most of the others stated the conviction that it would be desirable, if not necessary, to give the public an opportunity to take over electric railways if and when it so desired. Several felt that the public would lose interest in municipal ownership if it knew that it could buy the properties. Those who answered the above-stated query in the negative constituted a small minority in the first three classes, i. e., except the civicists.

Some of the more striking replies are given below:

#### COMMISSIONERS

It would be a wise provision, because if the public knew that it might acquire properties at its pleasure the public would lose interest in the chase.

It would probably be wise and would make it easier for the utility to secure an adjustment by making such a provision.



Such a provision would doubtless contribute to a more favorable public sentiment on the theory that it furnished the public with a possible remedy in the event of unsatisfactory private operation. Note I say "on the theory" that it provided a remedy.

No objection if this will stimulate public confidence and interest, the real object to be attained.

While I do not favor a general public ownership program, the communities should be free by law to determine for themselves how they will use their local utilities with, of course, fair dealings with the investors. The basis of purchase might very well be made a matter of general policy.

Most certainly. The public is more and more viewing a utility as only its temporary substitute in management and investment. When a definite basis for taking over the property is outlined in the franchise and accounts are open to audit by public authority, the pressure for public ownership will be reduced, for I can scarcely see how unfair practices can exist under this condition.

#### MAYORS

Provision should be made for municipal ownership at the option of the public, and if the franchise is not a limited one, there should be also the provision that if a new franchise is granted to any other company, it shall purchase the property of the old company at some fair valuation. If this is not done, it will not be possible for the operating company to finance any improvements or to keep up its property during the growing years of the franchise period.

Yes—or something approaching an equivalent like the "London Sliding Scale" in gas franchises with a city director in the board.

Public sentiment leans in this direction now.

No franchise should be granted without this provision.

#### REPRESENTATIVES OF CHAMBERS OF COMMERCE

The giving of such an option might disarm suspicion.

A purchase provision can be included in the franchise and would be a beautiful dream to help the contract through, but most companies are bonded for more than any liberal fair value and the community could not purchase for less than the indebtedness. In time depreciation might bring the two amounts together. Most thinking people are opposed to municipal ownership.

This would be a wise provision to make, to be taken advantage of or not, as the public demand might dictate.

Such a provision is not necessary, but most communities would insist upon it.

It might be best, so as to avoid lengthy proceedings should the community decide for public ownership.

#### CIVICISTS

A provision for purchase is not necessary but seems desirable. Government should have the option upon fair terms always.

Necessary and desirable. But with enlightened management and greater education the resort to public ownership will be long postponed.

Potential public ownership is imperative for the promotion of scientific transportation and public morality.

*If ultimate public ownership is an aim to be attained, should such ownership of electric railways be vested in municipalities or in the state, the fact being borne in mind that most electric railways serve communities other than the largest municipality in their district?*

In regard to whether public ownership, if it were to come, should be vested in municipalities or the state, the mayors and civicists took for the most part the city side. The commissioners and representatives of chambers of commerce, however, were divided almost evenly.

The idea was expressed in a large number of instances that the territorial extent of the railway should be the determining factor. A purely urban system would thus be left in the hands of the city, but a railway extending out into the suburbs and into other cities would better be placed under state ownership. An alternative in the latter case, however, would be the formation under state authority of a utility "district" with power to issue bonds.

Various detailed replies to this question are given in the following paragraphs:

#### COMMISSIONERS

The state should own the properties if the lines are partly within and partly without municipalities, and the city if the lines are strictly intra-city.

If public ownership comes at all, it should be through the organization and medium of "private companies" in hands of trustees for the public investment or guarantee.

It should be vested in a separate public corporation covering the entire transportation district.

Both state and municipality. The state should have superior jurisdiction and the power to use the city system as the terminal and operating organization for the lines serving the suburban towns.

In the municipalities under state regulation and supervision.

In most instances municipal ownership would probably prove the better, but in others state or even national ownership would doubtless be necessary.

All public utilities radiating from a populous center should be controlled by a metropolitan district, in which the state should be represented but the local communities largely in joint control, so adjusted that one community should not dominate the whole situation.

#### MAYORS

Ownership would be vested in municipalities. It would not be difficult for several municipalities to get together.

Perhaps laws might be passed extending the jurisdiction of cities outside their limits as in the case of the Metropolitan Park Commission of Boston. This would take care of the situation up to the point where the service becomes interurban.

State ownership, except where a railway serves a municipality exclusively.

Possibly a so-called "district" which would have power from the state to issue bonds, and which would be made up from the communities served.

#### REPRESENTATIVES OF CHAMBERS OF COMMERCE

Ownership should be vested in the governmental unit to which the utility is by jurisdiction responsible.

Railways should be owned in zones of service, like a school district, but this is probably impracticable.

State ownership would be more likely to be satisfactory, as it would keep the roads out of the field of local politics.

Of the two evils, state ownership would be the less.

Ownership of city electric railways should be municipal, and traffic arrangements should be entered into between municipalities and private suburban companies using the city streets. Suburban electric railways would probably continue under private ownership until public opinion justified their acquirement by the state.

Fundamentally such ownership should be vested in the state, but such a plan would not be popular because it kills all local interest and pride in the proposition.

The railways should be owned by the cities, with state regulation of service to outside communities.

Control should lie with municipalities, for cities have had more experience in operating utilities, and control would be vested only in the hands of the patrons.

#### CIVICISTS

No civic unit should attempt to operate except for its own people, and therefore ownership should vest in the state.

State ownership would not be feasible. Ownership should be vested in the predominating municipality, irrespective of the number of communities served.

The "public utility district" of California points the way to the necessity of home rule in the administration of transportation as of all other public services. Public regulation is a failure.

*If an electric railway were owned by one municipality, how could suburban communities be assured of adequate service and fair rates?*

In the event of public ownership by cities, the question of control over suburban service and rates would be of more than usual importance. It was the opinion of some mayors that the municipalities could be trusted



to give fair rates and adequate service to the suburban communities, especially in view of their self-interest in suburban property.

Other mayors doubted this, but only one suggested that the only safe method would be to have control over suburban service and rates in the hands of the state regulatory body. The majority of the commissioners, business men and civicists agreed as to the advisability of this latter method. Two commissioners would supervise even municipally-owned urban utilities.

Some of the replies were as follows:

#### COMMISSIONERS

Unless the regulatory body of the state had jurisdiction over the municipal authorities, a very difficult problem would be presented. If the state could have authority over joint rates and service, the matter would be simplified, but it is not likely the cities would submit in states where power is vested in cities.

Let state control and regulation apply to municipally owned utilities just as it now applies to those privately owned.

Only through the exercise of state police power of rate regulation and control.

The interest of the municipality in becoming the commercial center of the community would prompt suburban extensions. Indeed, the tendency would be to over-build rather than to refuse to make extensions.

Self-interest of the larger municipality could be depended upon to give satisfactory service and rates to suburbs.

The municipality would become a public utility and as such the state would regulate it as it now regulates private utilities.

Through the formation of a municipal utility district.

This is a problem which would unquestionably cause no end of trouble, unless some larger authority sufficiently free from domination by the principal city were created to have final authority. The metropolitan district idea appeals to me as feasible.

All electric service outside of the municipality should be under control of the state railway commission.

#### MAYORS

The railway should be left subject to the public service commission as it is now.

Adequate control of extensions by municipalities with authority to establish reasonable rates of fares on a particular extension, even though higher than the general city fare, backed by public opinion, would probably take care of such situation.

I should expect no difficulty here.

Suburban patrons probably would not get adequate service and fair rates.

The patrons of suburban lines would be treated fairly by the city.

Assurance can probably not be given, but the service can be made as adequate as it is now. What a private corporation can do the municipality can do.

That is easy. How are water rates kept fair in publicly owned plants? The management stands or falls on the judgment of the voters on this matter.

#### REPRESENTATIVES OF CHAMBERS OF COMMERCE

By the establishment of a state public service commission, with authority to fix rates and schedules.

Through commissions formed to adjudicate such matters, as the Interstate Commerce Commission has controlled the practices of the steam roads.

Suburban railways should be under regulation and control of state commissions and be permitted to effect proper traffic arrangements with municipally owned lines just as they do at present with privately owned lines.

It would be impossible to handle satisfactorily the charge for service if the railways were controlled by one community.

#### CIVICISTS

The present state commissions would have to make the necessary adjustment. This would not be a vital problem as cities are more and more interested in the suburbs since they realize that suburbs are a main factor in a healthy city.

Outside companies could receive running rights into centers of large towns.

It is done in Great Britain. State public utility commissioners do not deal fairly with municipalities here. There must be worked out an organic relationship governing the spheres of federal, state and municipal ownership.

*If under a franchise public ownership could be secured at any time, at the option of the public, would there be any objection to having the franchise not otherwise limited as to duration?*

This last question brought a swarm of answers to the effect that an indeterminate franchise is not objectionable provided the public can at its will secure ownership of the railways. Several, however, preferred term franchises because of the opportunity for bargaining and revision under changed conditions. One combination view was that there should be definite terms with recurring periods of privilege of purchase.

A few of the replies follow:

#### COMMISSIONERS

I like the Wisconsin law, which provides for continuing franchises, with full control vested in the state.

No. A public utility franchise should be unlimited but subject to cancellation or revocation under proper circumstances and by a proper tribunal.

No, granted gradual amortization is provided.

If a property may be taken over any time by the public, I see no reason for any other time limit on the franchise.

Absolutely none—provided the fares and conditions of service as originally defined are subject to adjustment at reasonable intervals according to costs, etc.

All franchises should have a limitation.

#### MAYORS

It is very undesirable from the point of view of the municipality to grant franchises unlimited as to time.

Complete municipal control over the operation of the property with a simple method for its purchase by the municipality, with the allowance of an additional return on the actual investment, should give better results than the limited franchise.

There should be no time limitation as to date of expiration if the franchise contains a provision for public ownership at the option of the public.

I believe in a fairly long term franchise.

Yes. Public ownership might not be possible or desirable. Yet some local control is necessary, and the only way to obtain this is in revision at the end of the period.

#### REPRESENTATIVES OF CHAMBERS OF COMMERCE

Yes. Franchises should be limited, so that the two parties—railway and citizen—can arrange their affairs as conditions change. A franchise with option to purchase at any time could be drawn which would be fair to all, but I doubt if any railway is as yet so hard up that it would agree to one fair to anyone but itself.

I can see no objection, unless that it might offer a precedent for other public service corporations, not open to public ownership, to ask unlimited franchises.

It seems to me that the franchise should be subject to review at stated intervals.

The policy of giving only revocable locations and not franchises of definite or unlimited periods appears in the practice of years to be sound and best.

I prefer definite franchise terms with recurring periods of the privilege of purchase on reasonable notice.

#### CIVICISTS

I see none, except that in a community which does not believe in public ownership this might be equivalent to a perpetual franchise.

Yes, there should be some other limitation as to time. Cities are not always in a position to finance such projects.

Yes—unless an amortization plan were adopted. It is possible so to draw a grant as to make it indeterminate and yet protect the public.

An unlimited franchise under any circumstances would be undesirable because of changing conditions which would make necessary the adjustment of provisions other than those relating to option of purchase by the public.

Theoretically the indeterminate franchise is best, but the experience with it in Massachusetts is not reassuring.



# The Traffic Check and What It Showed on the Public Service Railway

Extensive "Origin to Destination" Check of Passenger Traffic, Conducted During Latter Part of Last Year, and Study of Location of Various Traffic Centers, Indicated Desirability of Multiplicity of Zones with Low Progressive Charge per Zone — This Principle Was Adopted in Zone System Proposed

IN THE TWO preceding issues of this paper an account has been given of the proposed zone fare system of the Public Service Railway, as described in a report submitted on March 11 to the Board of Public Utility Commissioners of New Jersey. The conclusion in the report as to the adoption of the particular fare system selected was based on a traffic survey taken on the entire system between Aug. 19 and Oct. 11, 1918. The report describes three kinds of traffic count, which have been used in the past, namely, the "on and off" check, the "cordon" count and the origin to destination check."

The "on and off" check, the report explains, is obtained by stationing checkers on as many cars as the circumstances require to record the number of persons boarding and alighting at each stop of the car. From this record, when tabulated, can be determined the number of persons riding in the car past any given point. This method of traffic count has generally been employed in connection with the determination of the adequacy of the service. In the cordon count, observers at designated points note the number of persons on each car as it passes. If the points selected are possible zone limits, this count will determine the number of persons riding from one zone to another.

According to the report, the great defect of both of these kinds of check is the fact that the traffic information obtained by them is necessarily incomplete. Under either method it is impossible to determine the distance traveled by any particular passenger or group of passengers. The "on and off" check shows where a person boards the car but it does not show where that particular person leaves the car. It is impossible to determine by this method the number of people taking short rides or the number taking rides of any given length. As soon as a passenger boards the car his identity is lost. He becomes one of the total number on the car. It is impossible to tell whether he gets off at the next stop or rides 5 miles or more. All that can be determined from the use of the "on and off" check, or this check combined with the "cordon count," is the number of persons who board or alight within a given area and the number of persons passing a given point. It is impossible to determine the amount of short riding which exists between two or more zones or whether persons boarding a car at a transfer point began their journey at that point or whether they traveled to the transfer point on another car. Even though the character of fare paid by the passenger is noted, no information can be secured as to the length of the ride previously taken on other cars by persons boarding at transfer points and presenting transfers.

The report also observes that the experience of companies in other cities in which a zone system has been tried, showed that in almost every case there was a wide divergence between the traffic estimated under the zone



PORTION OF TRAFFIC SECTION MAP FOR ESSEX DIVISION, MADE FOR TRAFFIC COUNT

system and that which was actually handled after the system became effective. In every instance the travel was overestimated and the earnings were correspondingly overestimated. This led the management of the Public Service Railway to the conclusion that the traffic data upon which these previous decisions were based were faulty and that in its case a more elaborate method of traffic count should be adopted. In consequence, the third method, which was very similar to that employed by the Director of Transit of Philadelphia in 1913, was employed. In this, a record is taken of the point at which the passenger gets on the car and the point to which he travels.

## PREPARING FOR THE TRAFFIC CHECK

The first step was to divide the territory covered by the lines of the Public Service Railway into arbitrary districts or sections, known as traffic sections. These sections were usually  $\frac{1}{2}$  mile in length, that is to say, in the direction in which the line runs. In thinly-settled territory, sections of  $\frac{1}{4}$  mile, and in some cases



1 mile, were adopted. The subdivision of each operating division into traffic sections was begun from the main points of traffic, such as for example, Broad and Market Streets and the Public Service Terminal in Newark, and each traffic section was given an individual number. A portion of the traffic section map for the Essex division, showing the district surrounding Broad and Market Streets, is illustrated by the map on page 644. The boundaries of the sections and the number of each section are indicated in the original map in red.

The  $\frac{1}{2}$ -mile division adopted was smaller than that in the Philadelphia count mentioned where districts 1 mile square were used, but the purpose of the traffic count on the Public Service Railway was different from that which inspired the Philadelphia count. The latter check was taken to determine the necessity for rapid transit lines and the traffic which would be handled by such lines when and if constructed. The traffic section of 1 mile square was not considered advisable for the Public Service Railway because, while it simplified the work of compilation, it did not permit of sufficient elasticity in later applying the traffic data for the purpose of accurately determining proper zone points or the revenue which would be derived under a zone plan.

Following the division of the property into traffic sections, the next step was the preparation of "stop number cards." The stops on each line at which passengers may board or leave the cars were listed in sequence in each direction. An arbitrary number was then assigned to each stop. A list was then prepared showing the stops, in sequence, in each direction, together with the stop number and the section number for each stop. This information was then printed upon heavy Manila cards, showing on one side the stops in sequence "outbound" and on the reverse side the stops in sequence "inbound."

#### METHOD OF TAKING THE CHECK

The method of taking the check on the cars was to provide two checkers on each car, one of whom, called the "distributor checker," was required to station himself at the rear of the car near the conductor (when prepayment cars were under check) in a position where he could see the character of fare paid to the conductor by the passenger. This checker was supplied with "count slips," the appearance of which is shown in the cut on this page. On the reverse side of this slip the following words appeared:

Collection of this information is necessitated by an order of the Board of Public Utility Commissioners of the State of New Jersey. We ask your co-operation.

#### HOW TO FILL OUT THIS SLIP

Please write in space opposite words "I will end my car ride at" the street to which you intend to ride. If that street is on some line to which you intend to transfer, write in your destination on the transfer line and not the point where you leave this car to transfer.

These slips, identical in form, were used in two colors, white slips being used on all inbound trips and pink slips on outbound trips. As the passenger boarded the car the distributor observed whether he paid a cash fare or presented a transfer. A passenger presenting a transfer was not given a count slip, because of the fact that his journey on the transfer was presumably covered by the information furnished on the count slip given to him on the original line at the time he boarded the car and paid his initial fare. If the passenger paid a cash fare the distributor was instructed to observe

whether he purchased a transfer. If he did so, the distributor crossed the large T appearing on the right-hand side of the count slip; the purpose of doing so being to call the attention of the second checker, known as the "collector checker," to the fact that the passenger had bought a transfer and was destined to some point on another line than that on which the check was then being taken. While the passenger was paying his fare the distributor checker noted in the upper right-hand corner the number of the stop at which the passenger boarded the car, ascertaining this number from his "stop number card." Having filled in the "stop number," the distributor handed the count slip to the passenger, with the request that he write in his destination. After the passenger had been seated and had had sufficient time to look over the slip and fill in the desired information, the second checker, known as the "collector checker," approached the passenger and requested the slip. In practice, a large proportion of passengers did not themselves write in their destination, owing to the

OFF AT STOP No.		PUBLIC SERVICE RAILWAY CO. PASSENGER COUNT RECORD OUTBOUND	ON AT STOP No.	
SECTION No.			SECTION No.	
Date.....		Line.....		T
Starting Time.....		A. M. P. M.		
PASSENGER WILL PLEASE FILL OUT				
I will end my car ride at.....				
.....Street-Ave.				
.....Municipality				
SEE EXPLANATION ON OTHER SIDE				

FRONT OF "COUNT SLIP"—ONE OF THESE WAS FILLED OUT FOR EACH PASSENGER

fact that they did not have a pencil with them. In such cases the collector requested the passenger to hand him the count slip. The collector observed whether the T was crossed, thereby ascertaining whether the passenger had bought a transfer. The collector requested the passenger to inform him as to the passenger's destination. As an extra precaution checkers were instructed to ascertain from passengers giving their destination a transfer point whether the passenger intended to transfer to another line. The information as to the destination of the passenger was written in on the lower part of the count slip, the name of the street intersection and the municipality being given. If the passenger for any reason refused to give the desired information, the collector was instructed to thank the passenger and to note the fact that the passenger had refused to furnish the information. In a large proportion of such cases, which were comparatively few in number, the collector secured the blank count slip from the passenger and wrote across the face of it "Refused," turning this slip in, together with the others.

Incidentally it might be said that a notable spirit of co-operation was displayed by car riders, as evidenced by the comparative infrequency of refusals to furnish the desired information. This co-operation was fostered by a series of newspaper advertisements and posters displayed in the cars, explaining the reason for the check and the necessity for public co-operation to enable the company to carry out the order of the Board of Public Utility Commissioners concerning the formulation of a



zone plan. It will be remembered that the reverse side of the count slip carried an explanation to the effect that the collection of the information was necessitated by an order of the Board of Public Utility Commissioners.

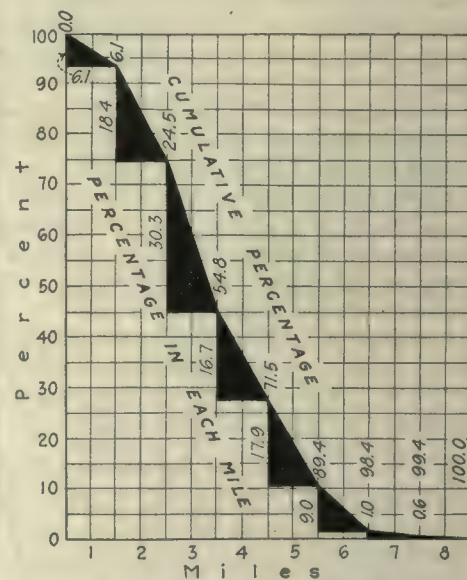
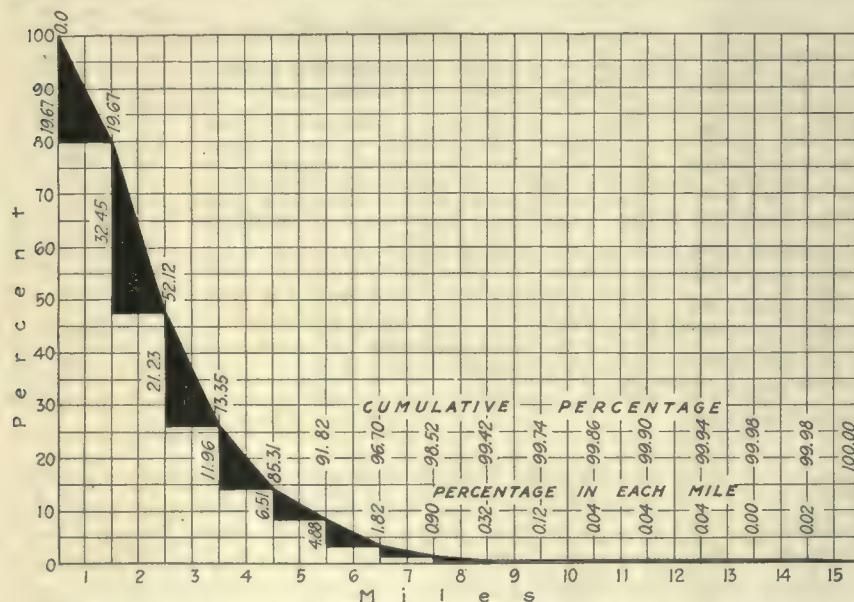
At the end of each half trip the "collector checker" inserted the count slips collected during that half trip in an envelope, which he sealed, filling out the following information on the face of the envelope:—date, name of line, inbound or outbound, run number, trip number, time of beginning half round trip, number of count slips inclosed, number of persons refusing information, any unusual circumstances, such as delays due to street blockades, the name of the distributor and the name of the collector.

#### PROPORTION OF CARS CHECKED

The matter of the proportion of service or the percentage of cars which should be checked was given most careful consideration. The investigation by the Director of Transit of the City of Philadelphia, already mentioned, was based upon counting the passengers on about one car in every five (eighteen-hour) cars oper-

believed possible to recruit the required number of checkers from the student bodies of some half dozen colleges and universities. Because of the large number of men called for military service under the selective service act, however, it was necessary to make many substitutions and it was found necessary to extend the field from which the substitutes were recruited to include seniors in high schools and other men possessing the required education. At the outset, at the time the check was inaugurated on Aug. 19, forty-seven men were available for service. The number was steadily increased, reaching a maximum of 100 men. The men were thoroughly trained for their duties; in addition, careful supervision of the work was provided through the regular street inspectors of the company.

The company followed the same plan used in the Philadelphia investigation of confining the check to what might be termed the normal days of the week, that is, Monday to Friday, both inclusive; in other words, no checks were taken on Saturdays, Sundays or holidays, or on the day following a holiday. Special provision was made for checking the lines entering the Public



A NUMBER OF THESE CHARTS WERE PREPARED, SHOWING THE DISTRIBUTION OF HOMES OF EMPLOYEES OF MANUFACTURING ESTABLISHMENTS SERVED BY THE COMPANY. THAT AT THE LEFT IS THE AVERAGE OF TWELVE SUCH CHARTS; THAT AT THE RIGHT SHOWS THE SITUATION IN THE WESTINGHOUSE LAMP WORKS

ated. The percentage of service thus checked was fully as great as had been covered in other checks previously taken. In view of the great importance of an accurate record it was deemed advisable by the Public Service Railway to take a larger percentage of the cars than were covered in Philadelphia and to extend the check to include not only eighteen-hour cars operated but also to make provision by which the desired percentage of service could be checked in the rush-hour period as well as when the lines were operated on the base schedule. The percentage of cars checked varied somewhat between the different lines, depending upon the headway and the traffic characteristics of the line, but averaged for the system 5 per cent of the total number of trips.

#### ENGAGEMENT AND TRAINING OF CHECKERS

The problem of securing a large number of competent persons to take the check at a time when war industries had practically depleted the labor market was one which required some time for its solution. Owing to the season of the year in which the check was taken, it was

Service terminal and other points where a system of prepayment areas prevailed.

The compilation of the results of this check was a stupendous task and required a large staff of clerks until the data showing the movement in both directions between each traffic section and every other traffic section on the system were finally compiled.

#### OTHER STUDIES CONDUCTED

While this traffic count was being taken and tabulated, the company made a study of other factors which had a bearing on the fare system to be selected. These included: (1) a distribution of the population in the district served; (2) the location of the factories, railroad stations and other centers controlling or creating traffic; (3) trackage built by the company within recent years to indicate tendencies in traffic movement; (4) growth in assessed valuations of sections served; (5) fares on competing steam railroads; (6) equalization of fares over the system, and (7) effect of the zone fare system on various classes of riders.

Maps showing the distribution of population were pre-



pared and clearly demonstrated the impossibility of creating central fare zones, sufficiently small to permit of a charge of a 5-cent fare and include therein even a considerable part of the built-up city areas. The situation in this respect, the report says, is entirely different from that which prevails in the smaller cities of New England served by the Bay State Street Railway, or the conditions existing in Providence or Pawtucket served by the Rhode Island Company. Not only is the territory comprised in Hudson, Bergen and Essex divisions more thickly populated than any sections in which a zone system has heretofore been tried, but the thickly populated area covers a wider range of territory than any city in America in which a zone experiment has been undertaken. Reproductions of two of these maps, those for the Essex Division and for the Hudson and Bergen Divisions, were published on pages 526 and 527 of the issue of this paper for March 15, although the titles under those maps were transposed.

LOCATION OF FACTORIES AS DETERMINING SYSTEM

Maps of the locations of the various factories, schools, theaters, etc., were also made and showed a condition which had an important bearing on the selection of the fare system finally adopted. The commonly assumed condition of cities with a central district in which is found not only office buildings and retail stores, but in which manufacturing establishments, giving employ-

DISTRIBUTION OF FACTORIES AROUND NEWARK		
	No. Factories	Total Employees
Located within 1 mile from Broad and Market	18	12,190
Located between 1 and 2 miles from Broad and Market	29	29,220
Located between 2 and 3 miles from Broad and Market	18	14,075
Located between 3 and 4 miles from Broad and Market	13	28,900
Located between 4 and 5 miles from Broad and Market	10	10,240
Totals	88	94,625

ment to the workers of the community, are also located did not exist in the communities served by the Public Service Railway. It is true, of course, that there is a concentration of retail establishments, department stores and office buildings in the limited area ordinarily referred to as the business center of the city, but the large manufacturing establishments which give employment to the major portion of the population are widely scattered. Thus, if Broad and Market Streets, Newark, the business heart of the city, is taken as a center, the distribution of factories, employing 250 or more men each, is as indicated in the table above. The same general condition applies to Jersey City. It is less true of Paterson and Passaic, but even in these communities, the larger proportion of the establishments and their employees are found outside the 1-mile zone. A study was also made of the distances at which the employees in some of the larger factories lived from the works, and typical diagrams are shown. These facts had an important influence in deciding the company in favor of the zone system adopted, with its multiplicity of zones and small added rate per zone.

DETERMINING STANDBY AND MOVEMENT COSTS

There remains to be given a description of the process by which the fairness and reasonableness of the proposed rates of 5 cents for the first zone and 1 cent per zone-mile thereafter were determined. The Public Service Railway followed the general method

employed by the Wisconsin Railroad Commission in the Milwaukee Electric Railway & Light case, with such variations from the Milwaukee basis of apportionment of terminal and movement expenses, and the basis used by Sloan, Huddle, Feustel & Freeman in the Bay State Street Railway case, as were necessary to fit conditions peculiar to the New Jersey company.

APPORTIONMENT OF OPERATING ACCOUNTS TO DETERMINE COST OF SERVICE OF PUBLIC SERVICE RAILWAY

	Track-Mile	Car-Mile	Car-Hour	Revenue Passengers Carried
Way and Structures:				
1 Superintendence	a	a		
2 Ballast	100%			
3 Ties	100%			
4 Rails	10%	90%		
5 Rails, rail fastenings and joints	10%	90%		
6 Special work		100%		
8 Roadway and track labor	40%	60%		
9 Miscellaneous track and roadway expense	b	b		
10 Paving	50%	50%		
11 Cleaning and sanding track	90%	10%		
12 Removal of snow and ice	90%	10%		
14 Elevated structures and foundations	90%	10%		
15 Bridges, trestles and culverts	90%	10%		
16 Crossings, fences and signs	100%			
17 Signal and interlocking apparatus				
18 Telephone and telegraph lines	90%	10%		
19 Miscellaneous way expenses	c	c		
20 Poles and fixtures	100%			
21 Underground conduits	100%			
22 Distribution system		100%		
23 Miscellaneous distribution expense	d	d		
24 Buildings, fixtures and grounds	90%	10%		
25 Depreciation of way and structures was distributed among the various accounts affected				
Equipment:				
29 Superintendence	e4.02%	e95.98%		
30 Passenger and combination cars	f	f		
32 Service cars		100%		
33 Electric equipment of cars		100%		
36 Shop equipment	g4.02%	g95.98%		
37 Shop expenses	g4.02%	g95.98%		
38 Repairs of vehicles	g4.02%	g95.98%		
40 Depreciation of equipment distributed to various accounts, as shown above				
Power:				
59 Power from other sources		100%		
Conducting Transportation:				
63 Superintendence		h	h	
63t		100%		
64 Passenger conductors, motormen and trainmen		100%		
66 Miscellaneous car service employees		100%		
67 Miscellaneous car service expenses		i	i	
68 Station employees				100%
69 Station expenses				100%
70 Carhouse employees				100%
71 Carhouse expenses				100%
72 Operation of signal and interlocking system				100%
78 Other transportation expenses		i	i	
Traffic:				
79 Superintendence and solicitation and advertising				100%
92 Injuries and damages				100%
General and Miscellaneous:				
97 Rent of tracks and facilities		100%		
Summary of Other General and Miscellaneous Expenses and Taxes**				
	7.28%	39.67%	41.06%	11.99%

(a) Overhead, Accounts Nos. 2-24.  
(b) Overhead, Accounts Nos. 2-8 and 10-11.  
(c) Overhead, Accounts Nos. 2-16.  
(d) Overhead, Accounts Nos. 17-18 and 20-22.  
(e) Overhead, Accounts Nos. 30-38.  
(f) Twenty-five per cent of depreciation (for obsolescence) charged to track miles and 100 per cent of the balance to car-miles.  
(g) Overhead, Accounts Nos. 30-33.  
(h) Overhead, Accounts Nos. 63c. and 64-78.  
(i) Overhead, Accounts Nos. 63c. and 64-72.  
\* One-half of 6 1/2 per cent of Account No. 30 (for painting cars) is charged to track-miles.  
† Inspectors, assistants and starters represent 50 per cent of Account No. 63 taken as Account No. 63c.  
‡ Account No. 67 is apportioned as follows: 55 per cent—Lamp Lubricants, Waste and Miscellaneous Supplies, 100 per cent to car-miles, \$158,400. 40 per cent—Inspection (secret), 100 per cent revenue passengers carried, \$115,200. 5 per cent—Miscellaneous Car Service Expense, 100 per cent to car-miles, \$14,400.  
\*\* All general expenses and taxes are treated as overhead and apportioned on basis of total direct expenses, with exceptions of Account No. 92, "Injuries and Damages," and Account No. 97, "Rent of Tracks and Facilities."



The theory underlying the apportionment of operating costs, as expressed by the Wisconsin commission, is that, in the first place, costs such as a portion of maintenance and repair of roadway and rolling stock, power expenses varying with the demand, depreciation due to the elements, and a portion of the return on the investment are dependent upon the size or location of the plant and are not affected by any possibility of increased traffic. These are terminal costs.

#### SOME COSTS PARTLY VARIABLE

With a limited demand for service, however, certain additional costs are occasioned. Among these are wages of conductors and motormen, the output cost of power, and that portion of maintenance and depreciation of roadway and rolling stock caused by travel and wear. A portion of such costs will vary with the number of passengers hauled. These expenses are partly fixed and partly variable and may hence be divided between movement and terminal costs dependent upon traffic conditions on each line. The ratio of the average car-load to the comfortable load will determine the division.

Moreover, there are additional costs which undoubtedly vary with the number of passengers carried or density of traffic. Among these are the cost of injuries and damages and a certain part of the transportation expenses, notably the cost of car station employees, dispatchers, operation of the telephone system, and the cost of printing tickets and transfers. This entire group of expenses is included in movement costs.

In addition to the foregoing three groups there is a small additional portion of the total expenditures which cannot be definitely localized, such as administrative costs. Such overhead costs are prorated in the proportion that the direct movement and terminal costs bear to their total.

The rule promulgated by the Wisconsin commission and since generally followed in such investigations, the report of the Public Service Railway says, has been to select for expenses varying with the volume of traffic a traffic unit, such as the car-mile or the car-hour, and for expenses not affected by the volume of traffic a stationary unit, such as the track-mile. In addition, there remains a class of expense varying directly with the number of passengers carried. Accordingly the operating accounts prescribed by the Board of Public Utility Commissioners of New Jersey were apportioned among these four groups, as shown in the accompanying table on page 647.

#### TRANSFER PASSENGERS COST MORE

The most important variation in the present case concerns the matter of a repetition of the full terminal charge against a transfer passenger. The "readiness-to-serve" cost for the person about to board a car on a transfer is as great as that of the person paying a cash fare. The same facilities must be provided for each. The transfer passenger uses two cars, boards and alights twice—increasing the accident hazard from this source—requires the issuance of a paper ticket and the expense of checking, auditing and accounting for the same, and in other ways is a more expensive passenger to haul for a given distance than the passenger traveling on only one car.

If the terminal or "stand-by" costs were figured on the basis of the total number of persons boarding the cars, irrespective of whether they paid a cash fare or

secured a transfer, the average stand-by cost of the Public Service Railway for the year ending June 30, 1920, would be about 3.384 cents. This sum would represent, on a strict basis of accounting, the stand-by cost which should be paid by the transfer rider when he boarded the initial car and again when he boarded the transfer car, the movement cost also being paid for the distance ridden on each car.

While the company felt it to be manifestly impractical to work such a radical revision in American practice, it believed that the transfer passenger should contribute something toward the extra expense which he causes. It decided to recommend that of the total stand-by cost of a transfer passenger 1 cent should be charged to him and the balance of 2.384 cents distributed over those using transfers and those riding on only one car. The transfer for which the passenger would pay 1 cent on the initial car would enable him to escape the payment of the stand-by charge on the transfer car, and, therefore, would effect in substance a saving of 4 cents below the rate which would be charged a person beginning his journey on the transfer car at the transfer point and paying an initial fare.

The company, therefore, calculated its cost of ride as follows for the year ending June 30, 1920:

Expenses varying with car-mile.....	\$7,463,197
Expenses varying with car-hour.....	7,724,471
Fixed charges.....	5,350,000
Contingencies and return on investment.....	1,228,988
<b>Total.....</b>	<b>\$21,766,656</b>
44.29 per cent (percentage of passenger-miles to seat-miles) represents movement costs.....	9,640,452
55.71 per cent (for extra seats) represents stand-by costs.....	12,126,204
Stand-by costs are made up as follows:	
Expenses varying with track-mile or those independent of traffic.....	1,368,447
Proportion of movement costs, as above.....	12,126,204
<b>Total.....</b>	<b>\$13,494,651</b>
Deduction for revenue from 1 cent for transfer.....	858,048
<b>Balance for passengers paying initial fares.....</b>	<b>\$12,636,603</b>
Division by the number of passengers paying initial fare gives 4.03811 cents for the stand-by cost per passenger.	
Movement costs are made up as follows:	
Expenses varying with the passengers carried.....	\$2,255,745
Proportion of movement costs, as above.....	9,640,452
<b>Total.....</b>	<b>\$11,896,197</b>
Division by number of zone miles gives 0.99007 cent for the movement cost per zone-mile.	

A table showing what would be the total cost of handling passengers for rides up to ten zone-miles was published in the *ELECTRIC RAILWAY JOURNAL* of March 15, page 528.

#### How Soldiers Are Trained

Those interested in the training of railway employees according to army methods will have an opportunity to examine an exhibit on this subject on the third floor of the Engineering Societies Building, New York, from April 1 to April 12, 1919. The exhibit shows the methods developed by the committee on classification of personnel in the army and consists of a collection of wall charts, forms, photographs and models showing how the army finds out what men can do best and how it uses that information, how officers are rated and fitted into place and how their work is checked and supervised. The collection is being shown under the auspices of the National Association of Corporation Schools and the United Engineering Society. It was on exhibition for several weeks at Washington where it attracted so much attention that in response to many requests the adjutant-general consented to its display in other cities.



# A. R. E. A. Holds Post-War Convention

Assembly of Railway Engineers at Chicago Last Week Was the Largest Gathering in the History of the Association—A Summary of the Reports of Interest to Electric Railways Is Given

THE twentieth annual convention of the American Railway Engineering Association was held at the Congress Hotel, Chicago, on March 18, 19 and 20, while the National Railway Appliance Association simultaneously held its exhibit in the Coliseum. That the return to peace conditions and the prospects of the return of the railroads to private operation has had a stimulating influence on this industry is evidenced by the exceptionally large attendance. The registration at the A. R. E. A. sessions reached the high-water mark of 509 and it is stated that the attendance at the Coliseum aggregated more than 23,000. No little credit for this large attendance is due to the fact that the Railroad Administration urged all engineering and maintenance of way officers who could be spared to attend, and also to the fact that little construction and maintenance work is now being done.

The A. R. E. A. program began on Tuesday morning at 10 with an address by President C. A. Morse. He spoke of the benefits to be derived from the arrangements by which the association is to work in closer connection with the American Railway Association and of the importance of the fact that the report of the track committee giving recommendations for standard frogs and switches had been approved by a committee of manufacturers, and he urged a wider adoption by the larger railroads of the standards of the association. Greater uniformity is needed in the matter of forms for reports and records in connection with maintenance of way and structures and in the rail sections used.

Following the reports of the secretary and the treasurer which showed ninety-seven new members admitted during the year and more than \$37,000 on hand on Dec. 31, 1918, the various reports were received and acted upon. Those reports which are of especial interest to electric railway men are abstracted very briefly below.

## REPORTS PRESENTED

*Signals and Interlocking*—A very complete report was presented on the problem of signaling single-track roads with reference to the effect of signaling and proper location of passing sidings on the capacity of the line. In order to apply and test formulas and methods in use, the committee worked out an analysis of the effect of passing track locations on 88 miles of line. Results were given in the form of graphical charts showing results obtained with the present as well as with proposed arrangements of passing sidings. A report was also given on automatic train control, which should be of particular interest to large electric railway rapid transit systems.

It was brought out in the discussion on this report that all the matter submitted has been passed on and approved by the Signal Association.

*Economics of Railway Labor*—In a report on labor-saving devices the committee presented a list of sixty such devices with short descriptions of these machines and their purposes.

The discussion on this subject concerned the advisability of giving the roadmaster more latitude in the placing of men on his division and emphasized the fact that the low rate of efficiency of laborers is due to the housing and food furnished these men by the railroads. At an evening session this report was continued by the presentation of a series of slides illustrating the use of labor-saving devices.

*Track*—The committee on track presented plans for split switches, split-switch fixtures, rigid frogs and spring frogs. A progress report was also presented on the matter of reducing the taper of the tread of wheels from 1 in 20 to 1 in 38, and on canting the rail inward.

A considerable discussion arose as to the wisdom of adopting the committee report recommending the bolted frog as standard practice without showing any alternate or permissible plan including the clamped frog, for many thousand miles of railroad are using this latter type successfully. The plans were adopted with the provision that the committee at the next convention recommend a plan for a clamped frog and report further on adjustment of the connecting rods.

## CONCRETE FENCE POSTS FAVORED

*Signs, Fences and Crossings*—The reports of this committee consisted of the presentation of the subjects of the protection of grade crossings, of the operation of crossing signal bells and of concrete and steel fence posts. Many data were presented on concrete types of posts, together with steel fence posts and braces. Comparatively few steel posts were used during the year. Those roads on which wood posts are standard were not inclined to change to other types at present prices. In general, those roads using concrete and steel posts report satisfactory service.

*Wood Preservation*—Important revisions were made in specifications for creosote oil and for creosote coal-tar solution. The method for determining absorption was revised to include a method covering creosote coal-tar solution. The wording and details of the analysis of creosote oils was revised to include fuller details. Important revisions were also made in the specifications for zinc chloride to bring them up to date. A specification was adopted covering a method for determining the strength of the zinc chloride solution, as well as a revision in the specification for treatment of ties by the Burnett process.

An extensive report was presented on zinc-treated ties. Particular attention was called to the need for thoroughly air seasoning zinc chloride-treated ties at least sixty days before placing them in the tracks. This will increase their spike-holding power, save in shipping weight, reduce the tendency to leaching, and prevent signal disturbance. Climatic conditions control results obtained with this treatment more than with any other, and in localities where excessive rainfall is found, as on the Gulf and Atlantic coasts, the zinc chloride treatment will not give as good results as in



the Central and Western states, but in any event the treatment will double the life of the timber. The committee recommended as a subject for future consideration "the availability and use of sodium fluoride as a preservative for cross-ties."

These revised specifications adopted are the same as proposed for adoption by the American Wood Preservers' Association.

**Stresses on Track**—The work of this important committee was hindered by the war, and comparatively little progress was reported, although considerable data have been gathered on stresses under and in the tie, and work is progressing on the principles governing the design of tracks.

**Roadway**—This committee presented conclusions on the methods of preventing and curing water pockets in the roadway, and included an abstract of the report of the deputy commissioner of public highways for the State of New York on the subject of frost action with reference to the maintenance of pavements. Considerable information was presented on rolling roadbed with a steam roller.

After some discussion as to the value of the profiles submitted as indicating losses due to shrinkage of embankments, because nothing was said about subsidence or materials, they were received as information. The remainder of the report concerning the prevention of water pockets was also accepted.

#### REVISED SPECIFICATION FOR STEEL RAILS PRESENTED

**Rail**—This committee presented a report on the methods of testing rail joints, together with a revised specification for steel rails. This latter includes a change in the manganese content, an increase in the carbon content for rails over 111 lb. per yard in weight, a change in the acceptance analysis so that acceptance depends on a sample from the finished rail instead of a ladle test ingot. The quick bend test was also included as an alternative for the drop test.

The results of an investigation of heat treatment of joint bars shows that while ordinarily the rail joint has a lower elastic limit than the unbroken rail, still joints made with bars of suitable design and heat treatment have elastic limits higher than the continuous rail. A further report of interest was presented on the subject of transverse fissures in rails. Investigations have shown that failures from this source have been much less numerous in rails from reheated blooms than from direct-rolled rails. A report on the results secured by seventeen roads with frictionless rail on curves gives data of interest.

The revised rail specifications were accepted for discussion and printing in the Proceedings and the recommended method of testing rail joints was adopted.

**Electricity**—This committee submitted a list of definitions of electrical terms for insertion in the Manual.

Delegates from the committee have met with a committee from the American Electric Railway Engineering Association and discussed the subject of specifications for transmission-line crossings over railroad right-of-way and the report is now being printed. It will be ready for action of the fall meeting of the A. E. R. E. A.

**Ties**—Reports for information were presented covering the effect of the design of tie plates and track spikes on the durability of ties, and on the methods used by railroads for controlling tie renewals. The usual report on substitute ties contains one item of interest in its reference to the test of the Goodlett ties

on the Oakland, Antioch & Eastern Railway. This type of track tie was described in the *ELECTRIC RAILWAY JOURNAL* of Jan. 11, page 100.

As usual, considerable discussion developed on the screw spike. One statement was to the effect that this spike would undoubtedly prolong the life of soft pine ties and another was that one of the errors made in its use was the substitution in a tie of the screw spike by another with the same diameter of shank, but a different thread. This naturally spoils the thread in the wood. The Lackawanna uses the screw spike with flat-bottomed plates to eliminate the excessive wear of flanged plates on creosoted bridge ties. The committee reported that it was not prepared to present conclusions on the relative merits of cut and screw spikes.

It was urged that preliminary inspection of ties for renewal rather than post mortem examination be given more consideration. One road stipulates that a track foreman cannot renew more than a designated number of ties per rail length without inspection and permission by his superior. The reports were received as information.

#### INCREASED ATTENTION GIVEN TO CONCRETE SLAB BALLAST

**Ballast**—The report of this committee contained additions to bibliography of ballast and ballasting. The elimination of soft spots in roadbeds by means of concrete slab ballast is receiving increased attention and merits further study. The diagram of a ballast gang of seventy-seven men was accepted as a suggested diagram for such a force, but some of the members felt this was a larger force than necessary.

**Economics of Railway Location**—The report of this committee included the effect of curvature on the cost of maintenance of way and equipment.

It should be pointed out here that the theory heretofore accepted is that curve expenses, including rail wear, generally vary directly with the degree of central angle irrespective of the degree of curve, while this committee suggests that excess rail wear on curves and some other curve expenses, vary with the square of the degree of curve. This report brought out extended debate in which it was stated that rail wear depends to some extent on elevation in curves and upon the class of traffic using the curves. High elevation in track used by both passenger and freight causes excessive wear of rail. It was also suggested that co-operation with the motive power engineers would be helpful as flange wear on certain types of electric locomotives is much greater than on other types.

Further reports of interest to electric railway officials were those presented by the committee on uniform general contract forms, which included a form of agreement for railway grade crossings; a report by the committee on buildings, which contained conclusions covering the design and merit of high and low station platforms, and a comparison of "umbrella" vs. "butterfly" sheds at stations.

#### OTHER REPORTS

A report of the committee on conservation of national resources included recommendation of the Fuel Conservation Section of the Division of Operation, United States Railroad Administration, covering the saving of fuel in stationary power and heating plants. A report of the committee on wooden bridges and trestles included results on the effect of preservative treatment on long-leaf and loblolly pine and Douglas fir bridge



timbers, and an interesting report by the committee on water service included the design of impounding reservoirs and conditions under which they are economical. This also included a report on the types of water meters for use in railway service and methods of testing and reading meters.

#### NEW OFFICERS

The convention adjourned on Thursday afternoon, following the announcement and installation of the following new officers: President, Earl Stimson, general superintendent maintenance of way Baltimore & Ohio Railroad, Baltimore; first vice-president, H. R. Safford, engineering assistant to regional director Central Western region, Chicago; second vice-president, J. A. Atwood, chief engineer Pittsburgh & Lake Erie Railroad, Pittsburgh; treasurer, George H. Bremner, district engineer Division of Valuation, Interstate Commerce Commission, Chicago; secretary, E. H. Fritch, Chicago.

## Reclaiming Contact Shoes by Welding

**Wrought-Iron Plate Is Welded into Wearing Face of Worn-Out Shoes at \$1 Less than Cost of New Shoe**

**W**ROUGHT-IRON contact shoes of the type shown in the accompanying illustrations are used by the Brooklyn Rapid Transit Company on its elevated cars. These are forged and machined in the shops of the company. The construction is very simple and the expense of making these shoes is very low.

Due to war conditions, the obtaining of material from which to make these shoes was very difficult during the past year. It thus became necessary to provide a means for repairing worn shoes in order to keep the cars in service. Examination of the worn shoes showed that a wrought-iron plate of the same thickness as the wearing portion of the shoe could be very readily welded into place and the shoes thus made as good as new. The Eastern Division elevated shop of this company is used largely for the manufacture of various equipment parts required for car operation. The shop is equipped with three different types of welding equipment, electric, oxy-acetylene and thermit, and so was admirably adapted to carry on this work.

An accompanying illustration shows several of the contact shoes as they have been removed from cars for

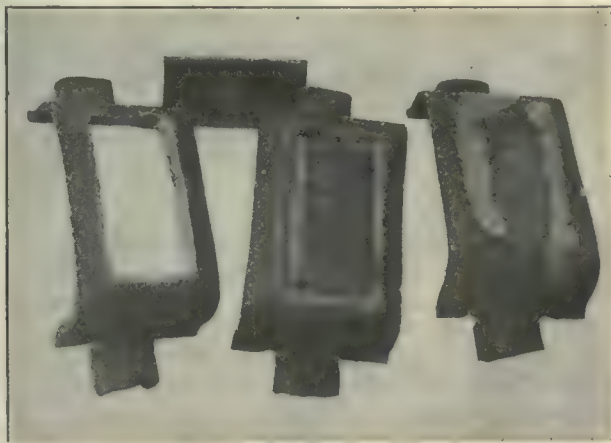
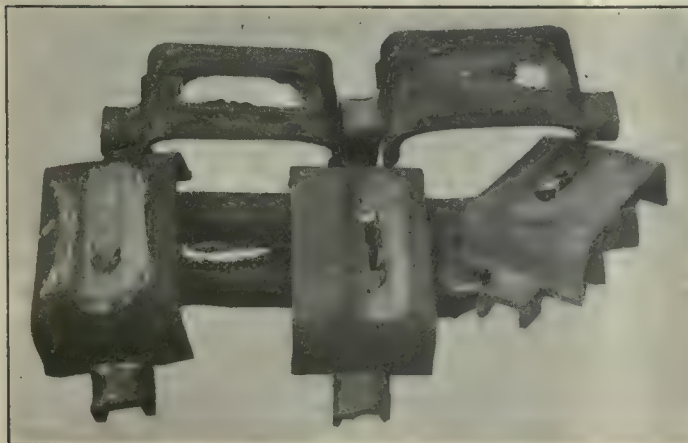
being excessively worn. It will be noted that the wear is confined to a space of approximately 4 in. x 8 in., and that outside of the worn portion there is ample metal to provide for welding in a plate. The process as now being carried out consists first of cutting out a square hole in the wearing surface of the contact shoe. The edges of this hole are beveled so that when the plate is inserted a V will be formed for holding the welded metal. This cutting out of the face of the contact shoe is done with an oxy-acetylene torch. These holes are cut to uniform dimensions of 4 in. x 8 in. The plates are of the same dimensions as the hole cut and of the same thickness as the wearing surface of the shoe. The edges of the plate are also beveled to form the other side of the V already referred to.

After inserting the plate in position, it is held in place by welding the corners slightly, after which the welding by filling in the V may be done by either the oxy-acetylene or electric methods. Both have proved equally efficient.

The various steps in the repair of the shoes are shown in the accompanying illustration. This work, which was originally begun as a war measure, has shown a decided saving in the cost of maintaining the contact shoes. In comparing costs under the present prices it is found that a saving of approximately \$1 per shoe is made by welding in the plate instead of scrapping the shoe and making a new one. As approximately 6,000 of these shoes are replaced each year this would result in a considerable saving.

## Electric Railways in Japan

According to a recent report of the Department of Commerce there are forty-two electric tramways in Japan and forty-eight combined tramway and lighting systems. American manufacturers have sold most of the equipment used on these lines in the past. The Mitsubishi Dockyards & Engineering Company is a Japanese manufacturer which has recently entered the construction field for electric railway equipment. In connection with the railway shops of the South Manchuria Railway at Darien in Manchuria, this company is reported to be making electric locomotives for service where American and German apparatus was previously purchased. Another large company which is apparently entering the electric railway field to some extent is the Hidachi Company, which has built several electric locomotives for its own use.



RENEWING WEARING FACES OF CONTACT SHOES

At Left, Several Worn-out Shoes. At Right, Hole Cut Out for Plate, Plate Inserted and Repaired Shoe Completed.



# Wisconsin Association Discusses Service and Securities

**Papers Delivered at Annual Convention of the Wisconsin Electrical Association Contained Views of Utility from Standpoints of Banker, Commissioner and Operator  
—Safety Car Was Not Forgotten**

**"SERVICE FIRST"** was the paramount thought of the first day's session of the Wisconsin Electrical Association meeting held at Milwaukee on March 26 and 27. This was the eleventh annual convention of the association. The greater part of the first day was devoted to a joint meeting with the Wisconsin Gas Association at which papers of a general character were read.

## A BANKER'S VIEWS ON THE UTILITY SITUATION

The first speaker was Chester Corey, Harrison Trust & Savings Bank, Chicago, whose topic was "Public Utilities and Securities." He stated that public utility securities, omitting those of the steam railroads, are a creation of a comparatively few years. He divided the duties of the utility into three groups arranged in order of importance as follows: (1) Furnishing good service; (2) furnishing this service at reasonable rates; (3) making extensions of service which may not at first prove paying investments. He explained the unrealized interest which the public has in the success of the public utilities on account of the direct influence upon banks and insurance companies holding the securities, these institutions being the depository of the public's savings. The investment banker is responsible for financing the utilities along sound lines, and the utilities' chief problem is to maintain proper credit.

In speaking of credit Mr. Corey said it is generally conceded that an interurban railway which does not earn more than \$2,000 a mile is not entitled to credit; neither is a company having faulty capitalization. If fixed charges amount to 85 per cent of earnings, fluctuations of prices and periods of poor business may very easily wipe out the 15 per cent margin. Any company to retain good credit should earn one and one-half times its charges. As a result of the war the electric railways have suffered more than any other utilities and increased costs have destroyed the railways' credit. The investment bankers are on record as believing in the public service commissions and look to them to give assistance to the railway companies. One of the unfair conditions, however, which the utilities and the investment bankers are up against is that some commissions do not have the authority that they were intended to have.

In Mr. Corey's opinion the public must pay for the service which it gets and will be willing to do so if properly educated. He expressed a belief that some form of zone system of fare payment may be the scientific solution of the present predicament of the railways; also that private ownership under public management conduces to most economical and efficient management.

The afternoon joint session opened with an address on safety and sanitation by R. McA. Keown, engineer Industrial Commission of Wisconsin, followed by one

on the value of the quality of service by Hon. John S. Allen of the Wisconsin Railroad Commission. After a brief recess the Electrical Association convened and, following routine business, John St. John, assistant general manager Milwaukee Northern Railway, Cedarburg, Wis., delivered his presidential address. An important recommendation covered in the address was that hereafter the second session of the convention be divided into two parts, one to deal with problems relating to light and power companies and the other to take up those of interest to railways. This arrangement the speaker believed will increase the membership in the association and the attendance at the conventions. For the past two years there have been but few papers of interest to electric railway representatives. A committee was appointed to formulate a plan along the lines of this suggestion.

After the appointment of a nominating committee, N. J. Whelan, Wisconsin-Minnesota Light & Power Company, Eau Claire, read a paper on "Public Utilities Services to Industries," which is abstracted elsewhere.

As this issue of the ELECTRIC RAILWAY JOURNAL goes to press the March 27 session is being held. Papers are scheduled to be presented by F. A. Robbins, Superior Light, Water & Power Company, entitled "Comments on Overhead Distribution"; by Alfred Alfaker, consulting engineer, Chicago, Ill., on "High-Tension Outdoor Substations and Switching Equipment"; by A. J. Goodjen, statistician Wisconsin Public Service Company, on "A Review of Policies of Service Extensions," and by H. L. Andrews, General Electric Company, Schenectady, N. Y., on "Safety Cars." An abstract of Mr. Andrews' paper follows:

## Why the Safety Car Is Popular

**Its Use Results in Increased Receipts and Decreased Cost Per Passenger Carried**

BY H. L. ANDREWS

Railway and Traction Engineering Department General Electric Company, Schenectady, N. Y.

**O**F SEVERAL possibilities before the electric railways that will enable them to continue in business the most promising consist in making the service more attractive and effecting substantial operating economies. The means for obtaining the greatest operating economy and increasing the service is the safety car.

This car, which was designed some three years ago and has been operating for nearly that length of time on many properties, has a body 28 ft. long, seats thirty-two passengers when arranged for double-end operation and thirty-five when arranged for single-end operation. It is mounted on a single truck with 26-in. wheels and a wheelbase of 8 ft. The equipment consists of



two 25-hp. motors, a drum controller, and a "10-ft." air compressor. The safety features are incorporated in the controller handle and the motorman's valve, which are so arranged that should the motorman become incapacitated the power will automatically be cut off, the brakes will be applied in emergency position, sand will be blown on the track and the front and rear doors will be unlatched so they can be opened by hand. Only one operator is required, who is seated to the left of the center of the car platform with the fare box to his right and with foot pedals conveniently located for operating the fare registers.

The savings in platform labor by the use of one operator represent but little more than half the possible economies in the application of this type of car. By way of illustration of the possible saving due to the use of the safety car, we may compare the operating costs of a two-man car with the possible cost of operation of a safety car.

#### DATA FROM ELEVEN TYPICAL CITIES

The average operating cost for a two-man car on eleven representative roads operating in the smaller cities of the Middle West is approximately 22 cents per car-mile. The minimum is 15.69 cents and the maximum 25.81 cents. These figures include maintenance of way and structure, maintenance of equipment, power, conducting transportation, conducting traffic, and general and undistributed accounts. The average cost of each subdivision is as follows: Maintenance of way and structure, 2.2 cents; maintenance of equipment, 2.14 cents; power, 4.2 cents; conducting transportation, 8.7 cents; conducting traffic, 0.68 cent; general, 2.1 cents; undistributed, 1.93 cents; total, 21.95 cents. The average platform wage is 32 cents per hour, the minimum 29 cents and the maximum 37 cents. The average cost of power is 1.3 cents per kilowatt-hour, the minimum 0.58 cent and the maximum 2.1 cents.

The schedule speeds on the above roads vary from 7.7 m.p.h. to 10 m.p.h., with an average of 8.7 m.p.h. Headways vary from ten to thirty minutes with sixteen minutes as an average, and receipts per car-mile vary from 16.8 cents to 30 cents with an average of 24 cents. Car weights on these roads vary from a minimum of 18,000 lb. to a maximum of 40,000 lb. with an average weight approaching 30,000 lb.

The application of safety cars affects mainly the maintenance of equipment, power and platform expense. Actual records of maintenance from several roads which have been operating them for a sufficient length of time to obtain the maintenance costs indicate that the maintenance will not be more than 1.2 cents per car-mile. The saving in power is obvious as the safety car weighs less than half the two-man car. Its construction permits higher rates of acceleration and braking which affect an additional saving. Tests show that the car requires less than 1 kw.-hr. per car-mile for power, and including heat and light, about 1.5 kw.-hr. The saving in platform expense is obvious as only one operator is employed. It has been the custom to give the operator an increase in wages to compensate for the additional responsibility placed upon him, the usual increase being 10 per cent. The reduction in platform cost is therefore approximately 45 per cent.

A comparison of the totals of these three items for two-man and safety-car operation shows for the former 15.04 cents per car-mile, and for the latter 7.95 cents.

The reduction is nearly 50 per cent in the main items which affect the cost of producing service.

Consider these operating costs and assume an eighteen-hour car operating at 8.7 m.p.h. schedule speed. This car will operate 6570 hours annually. Allowing 5 per cent reporting time, the total of car-hours becomes 6900, and that of wages \$4,416 annually, allowing a rate of 64 cents. At 8.7 m.p.h. this car will run 57,159 miles annually and the cost for power at 4.2 cents per car-mile will be \$2,400. Maintenance, at 2.14 cents per car-mile, will cost \$1,223 annually, making the total cost of operation \$8,039.

A safety car making the same mileage will cost \$2,419 for platform labor, assuming 35 cents per hour as a rate for the safety-car operator. The maintenance cost at 1.2 cents per car-mile will be \$685, while the power cost at 1.95 cents per car-mile will be \$1,113. The total cost of operation is thus \$4,217, or \$3,822 less than that with the two-man car.

The safety car can be purchased for approximately \$6,000 ready to roll or, including 10 per cent for spares, the car will cost \$6,600. The annual reduction in operating costs is therefore equal to a return of approximately 58 per cent on the investment, on the basis of car-for-car replacement. Experience in the application of these cars, however, has demonstrated that they are more than a means of reducing the cost of producing service, and that the best results can be obtained by applying them in the ratio of three safety cars to two cars of the old type. In most cases, the schedule speed can be increased 10 per cent or more with the safety car, so that by operating 30 per cent more cars on a 10 per cent higher schedule a 40 per cent better service can be given with no increase in the operating costs. That the effect of improved service is reflected in earnings is shown by the experience that an increase of 40 per cent in service results in at least 20 per cent increase in gross receipts.

#### MORE SERVICE GIVEN AT LESS COST

Consider now the effects of a service improved by 40 per cent. First—car-hours are increased 30 per cent (since the schedule is increased 10 per cent), or for each car displaced the safety cars will operate 8970 hours annually. Assuming a platform rate of 35 cents per hour, the annual cost for platform labor is \$3,140. The car-mileage is increased 40 per cent, or to 80,000 car-miles as against 57,159 car-miles for each two-man car operating on a longer headway. Assuming car maintenance at 1.2 cents per car-mile and power at 1.95 cents per car-mile, the annual costs for these two items become \$960 and \$1,560 respectively.

The total cost for the above three items is \$5,660 as against \$8,039 annually for a two-man car operating at the lower schedule and with longer headway, a reduction of \$2,379 in operating costs. The improved service will, however, result in increased earnings, and on lines where a two-man car is earning 24 cents per car-mile or \$13,700 annually the operation of the safety car on shorter headway will result in an increase of at least 20 per cent or \$2,740 annually. These increased receipts together with the reduction in operating costs result in an annual increase in net of \$5,119, or equivalent to a return of nearly 60 per cent on an investment of \$8,600 (which would be the approximate price of the safety car, per each old-type car replaced, plus 10 per cent for spares). These savings are estimated from



operating costs. Consider in comparison the results actually obtained in the application of these cars in many cities.

#### THIS IS WHAT ACTUALLY HAS BEEN DONE

To-day there are more than 600 safety cars operating in more than sixty cities, with over 200 cars on order for twenty additional cities. The cities include those having populations from 36,000 to 345,000. After the initial installation of safety cars in any community their use has spread rapidly. From one car originally in Seattle, three in Bellingham and two in Everett, there are now thirty in Seattle, sixty in Tacoma, thirty in Bellingham and twenty-one in Everett. One of the oldest installations is in Fort Worth, where safety cars have been used for nearly 2½ years. The East has been slower in adopting them, but within the past few months installations have been made at Bangor, Bridgeport, Brooklyn and Trenton, while Philadelphia will shortly place twenty-five in operation.

In Fort Worth ten cars were installed in November, 1916, and twenty additional in October, 1917. Five lines were equipped with these thirty cars and the mileage was increased 27 per cent with a total reduction in operating costs of \$18,000 annually. The gross receipts on these lines have increased \$106,000 annually, which is 57 per cent. Of this \$60,000 or 30 per cent can be attributed to improved service. The net increase is, therefore, \$78,000. Ten additional cars were commissioned in September, 1918.

In Austin, Texas, three cars were placed in operation in April, 1916, and four more in August, 1917. They handle less than half of the total service of the town but the operating ratio for the system has been reduced from 66 per cent to 56 per cent as a result of increased receipts and decreased operating costs.

El Paso, Texas, introduced ten cars in February, 1918, equipping two lines. On one line the car mileage has been increased 47.9 per cent and the receipts 50 per cent. On the other line the increase in mileage has been 50 per cent and in receipts 36.7 per cent. The power consumption shows a reduction of 45 per cent.

Tacoma, Wash., equipped three lines with a total of thirty-two cars in December, 1917. On one the car mileage was increased 20.9 per cent with an increase of 25.8 per cent in receipts. On the second line the increase in car-mileage was 75 per cent and in receipts 42 per cent. On the third line, the increases were 3.4 per cent and 17.31 per cent respectively. Twenty-nine additional cars were placed in service in October, 1918.

In Seattle, Wash., two cars were placed in operation in 1915, two more in July, 1917, and twenty-five more in February, 1918. The first line completely equipped with ten cars, giving 55 per cent more mileage than formerly, shows an increase of 67 per cent in gross receipts or \$26,000 annually. Another line with 21.4 per cent more car-miles showed 29.5 per cent increase in receipts. On a third line 29 per cent increase in car mileage produced 49 per cent increase in receipts.

In Everett, Wash., service was inaugurated with four cars in October, 1916. Ten more were added in October, 1917, together with seven rebuilt cars. The service was increased 24 per cent and the earnings increased 38 per cent or \$47,000 annually. The power consumption was decreased 46 per cent. The annual net increase in earnings is \$75,000.

In Bellingham, Wash., three cars were placed in serv-

ice in December, 1916, thirteen more in August, 1917, and twelve more in 1918. Of the last-named eight were rebuilt cars. The service was increased 26 per cent, the receipts increased 42 per cent, and the power consumption was reduced 43 per cent. Fifteen more cars were added in September, 1918.

In Houston, Texas, one line is equipped with safety cars. Here the car mileage was increased 68.8 per cent and the receipts increased 41.2 per cent.

In Tampa, Fla., on one line the mileage was increased 51 per cent; a 51.4 per cent increase in receipts resulted. On another 29 per cent increased mileage produced 13 per cent increased receipts.

A city in the Middle West of approximately 75,000 population installed twenty of these cars a few months ago. During the first month the car mileage was increased 22 per cent, the receipts increased 13 per cent and the power was reduced 8 per cent. The second month's operation showed 24 per cent increased receipts for 27 per cent increased mileage, and the third 40 per cent increased earnings for 28 per cent increased mileage. Seventy-five per cent of the increase in earnings is attributed to the improved service. On one line the headway was reduced from ten to eight minutes without increasing the number of cars. On another line operating six cars the headway was reduced from eight to seven minutes. The increase in gross receipts due to this improved service was 7 per cent.

#### BRIDGEPORT AND GARY BRING THE LIST NEARLY UP TO DATE

Bridgeport, Conn., placed nine cars in operation in January, 1919. These operate on a line through the center of the city where traffic is as congested as in any city in New England. The service was increased 50 per cent and the increased gross receipts amounted to 30 per cent.

Gary, Ind., placed ten cars in operation about Feb. 1, 1919. The service was improved 35 per cent and the receipts increased 14 per cent. These cars are operating on a slower schedule than in most installations and it is entirely practicable to increase the service 20 per cent by increasing the schedule speed. Gary is a large manufacturing town and the new cars operate on a line serving the Indiana Steel Company's plant.

The results obtained with the safety car clearly indicate what has been accomplished under all conditions of service and prove conclusively that the field of the safety car is not limited to light riding lines, but that the car can handle all of the service in moderate-size cities and it can be economically applied to a large number of the lines in such cities as Brooklyn, Philadelphia and Chicago.

In conclusion it should be emphasized that the safety features, and the size and location of the controlling apparatus, are essential parts of the new cars. These features facilitate operation, and by minimizing manual labor make it possible for the operator to perform additional duties without interfering with the normal operation of the cars, or sacrificing safety. The safety features make it possible to handle a heavier traffic on a fast schedule with but one operator, and they help to overcome the objections of many public service commissioners to one-man operation. The higher schedule speeds possible with these cars are due entirely to the construction which permits high rates of acceleration and braking.



## Public Utilities Rendering Service to Industries

Public Utility Companies Should Establish an Industrial Department and Take an Active Interest in Community Development

By N. J. WHELAN

Wisconsin-Minnesota Light & Power Company, Eau Claire, Wjs.

IN TREATING this subject I shall not discuss the good which can be accomplished in rendering service to industrial corporations by street railways, inter-urban railways, electric light plants or gas plants, but shall describe the work carried on in the industrial department instituted about three years ago by the Wisconsin-Minnesota Light & Power Company. This will necessarily limit the paper to a review of what can be accomplished by public utilities to encourage the securing of industries for the communities in which they operate and thereby to become a part in community development.

Our industrial department was organized for the purpose of carrying out several clearly defined lines of work. First, a complete survey was made of the resources of the communities served by the corporation, data were collected as to the number of factories in each community, the numbers of people employed, the unemployed help available in contiguous localities, wage scales, prices of factory sites, railroad facilities, housing accommodations and adaptability of the community to various lines of manufacturing. The department was also at the disposal of each community to assist in the organization of commercial bodies where none existed in the locality and, in places where such organizations were in existence, to co-operate in work of an industrial character.

When conditions warranted and trips of investigation of industrial matters were desired, a representative of the department acted in conjunction with representatives of the board of trade or commercial club of the city interested, and without expense to it took such trips. While I do not claim for this department all of the credit for a number of industrial developments that have taken place, I believe that but for the direct and indirect assistance given through this department, a considerable number of these industries would not to-day be in existence in the localities in which they are now situated.

In addition to the work done along manufacturing lines the department also co-operated in the development of the natural resources of the different localities. A survey of industries in general was made also, with a view to ascertaining which industries promised most for community development. As a result of this work the conclusion was reached that among industries deserving of encouragement were automobile, truck and tractor manufacturing, the rubber industry, the iron-working industry and others.

A summary of the results of the work of the department shows that industries have been placed necessitating the employment of 975 people. In addition to the direct benefits to the communities and to the public utility company, a corresponding benefit of an indirect character must not be overlooked. That is, the increase in population has brought additional business to the grocer, butcher, barber, moving picture man, apartment house proprietor, hotel keeper and many others.

## AMERICAN ASSOCIATION NEWS

### One-Man Car Committee Prepares Questionnaire

AS A RESULT of the meeting of the joint committee on one-man car operation, composed of representatives of the Transportation & Traffic and Engineering Associations, held in New York City on March 26, members of the association will shortly receive blank forms with requests for data regarding experience with safety cars and opinions on the subject of the operation of such cars. The personnel of this committee is as listed on page 611 of the issue of this paper for March 22 except that since the list was printed C. H. Beck, St. Louis, Mo., has also been asked to serve upon it. The meeting was attended by C. W. Kellogg, Boston, Mass., chairman; S. W. Greenland, Fort Wayne, Ind.; J. K. Punderford, New Haven, Conn.; Clarence Renshaw, East Pittsburgh, Pa., and J. C. Thirlwall, Schenectady, N. Y.

In the preparation of the questionnaire a number of salient points were brought out. The chairman, for example, outlined as the four important features of safety-car operation the following: (1) Decrease in power costs; (2) elimination of jitney competition; (3) saving in trainmen's wages; (4) increase in earnings. A letter was read from an operator who had extended experience with safety cars in which the statement was made that the best results are secured when these are used in eighteen-hour service, such heavy cars as form part of the railway's equipment being used for tripper service. Operating data presented showed somewhat less than 1.6 kw.-hr. per car-mile for typical installations, about one-third of which is for heating, lighting, etc., two-thirds being for motive power. Informal discussion showed that experience of companies using safety cars has been that an increase in car-mileage produces at least one-half as great an increase in receipts and in some places the receipts are even proportional to the mileage.

There was some discussion as to just what constitutes a safety car, and one speaker pointed out that the present safety car is due to an original idea of saving weight in car construction.

### Power Saving the Topic at New Haven Meeting

THE Connecticut Company section held its twenty-sixth meeting at New Haven on Feb. 26. A dinner at the New Haven Lawn Club preceded the meeting, and instrumental and vocal music enlivened the program. The principal speaker was William Arthur who directs the power-saving work of the company. He was followed by Neil Lawson, power-saving inspector, who spoke of the motorman's point of view with respect to this matter, and by John Sayers, also of the power-saving department, who gave some reminiscences of the recent naval operations in the Mediterranean Sea.

In his talk Mr. Arthur presented figures and charts showing the reduction in coal consumption and in kilowatt-hours per car-mile which had taken place during the past year on each division of the company's lines. These results showed considerable variation, due chiefly to the fact that on certain divisions the power-saving

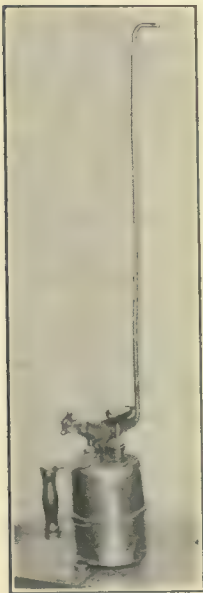


campaign had been but recently started, and so far only a portion of the cars have been equipped with power-saving recorders. The splendid showing made, however, on every division that was fully equipped was most noticeable when compared with those only partially equipped. During the discussion which followed and in which many members participated the fact was brought out that based upon the month's figures, the coal saving on a tonnage basis when all factors were equated, was about 20 per cent for the entire property.

There was a discussion also as to the effect of the use of power-saving recorders upon safety of operation and maintenance of equipment, and it was generally agreed that both of these features had been favorably affected, although it was not possible to state in figures the exact degree.

At the business session of this meeting the committee appointments for the year were made. Following are the names of the chairmen of the committees: Program, John W. Colton, New Haven; entertainment, W. A. Gordon, New Haven; reception, J. S. Goodwin, Bridgeport; membership, C. H. Chapman, Waterbury.

### Pressure Oiling Device Made from an Old Kerosene Torch



PRESSURE OILING DEVICE FOR LUBRICATING INACCESSIBLE PARTS

TO MAKE the oiling of inaccessible parts easier a pressure-oiling device shown in the accompanying illustration is used at the southern division inspection and overhauling shop of the Brooklyn Rapid Transit System. This oiling device has been made from an old kerosene torch by replacing the torch connection with a  $\frac{1}{2}$ -in. pipe about 4 ft. long. The pipe is bent slightly at the extreme end in order to make it easier to insert it at some inaccessible point and also so that the oil will not drip and flow down the pipe when it is used.

The regular air-pump attachment supplies the pressure to force the oil through the pipe, and by opening the torch valve the oil is forced out in a steady stream. Much time and labor is saved by the use of this device and there is no tendency on the part of the repairman to slight the oiling of the inaccessible parts. The lubrication of center bearings, side bearings and brake rigging on

electric cars often presents severe difficulties. When cars are over inspection pits the rigging is far above the workman's head and cannot be readily reached from the side of the car. Some roads make use of a short stepladder in the pits to reach parts close to the car body. Others use planks laid across the rails.

The subway cars of the Brooklyn Rapid Transit Company have a rack and pinion working inside the truck bolster for operating the empty and load braking device which forms a part of the equipment of these cars. Previous to the use of this pressure-oiling device it was necessary to jack up the car body in order to lubricate this rack and pinion. By the use of this pressure-oiling device the parts can be reached and lubricated without trouble.

## New England Club Dines at Boston

### Representative Men in Public Life Give Assurance to the Electric Railway Industry of Their Appreciation and Co-operation

THREE HUNDRED AND FIFTY persons attended the annual dinner of the New England Street Railway Club on March 27 at the Copley-Plaza Hotel, Boston. President R. W. Perkins, Shore Line Electric Railway, acted as toastmaster and the speakers were Lieut.-Gov. Channing Cox of Massachusetts, Hon. Thomas F. Sullivan, commissioner of public works, Boston, and United States Senator James A. Watson of Indiana.

Mr. Perkins criticized regulation without responsibility and urged recognition of the necessity for adequate electric railway income with removal of burdensome restrictions inherited from the early days of the industry and continued until the present time. Lieut.-Gov. Cox emphasized the vital importance of trolley transportation to community welfare. He claimed that the public is ready to meet the fair cost of service even if part of the burden must be lifted from the car rider. He said that the public must have a continuance and further development of electric railway service and that Massachusetts seeks to give the electric railways a square deal and a fair return upon the capital invested under state regulation. In closing he made a strong plea for the support of Americanism against Bolshevism.

Commissioner Sullivan brought greetings from Mayor Peters, who had been scheduled to speak. Senator Watson made a powerful attack on the policy of government ownership and operation, illustrating his point by reference to the huge excessive cost of railroad operation by the government. Despite increased rates the railroads had a deficit of \$275,000,000 during the first year of government operation. It has cost \$1,600,000,000 more to run the roads under the government than under private operation. Under these conditions Senator Watson urged the resumption of private operation with rate and security regulation by the Interstate Commerce Commission with abler and more courageous membership. He emphasized the dangers of government control leading to the formation of a great political machine with the fine edge of initiative dulled and socialism threatened. Senator Watson would repeal the Sherman and pooling laws as affecting railroads. In closing, he attacked the League of Nations constitutions as made public to date, and urged the retention of the Monroe Doctrine and national independence.

At the dinner the following were announced to have been elected to the positions named for the coming year: President, J. E. Dozier, Lynn, Mass.; vice-presidents—David A. Belden, Haverhill, Mass., I. A. May, New Haven, Conn., T. H. Kendrigan, Manchester, N. H., F. S. Nicholson, Rutland, Vt., Alfred Sweeney, Lewiston, Me., A. E. Potter, Providence, R. I.; temporary secretary, George W. Knowlton, Boston, Mass.; treasurer, Fred F. Stockwell, Cambridge, Mass.; executive committee—R. W. Perkins, Norwich, Conn., C. D. Emons, Boston, Mass., W. W. Field, Cambridge, Mass., John W. Belling, Boston, Mass., L. P. Morris, Boston, Mass., A. A. Hale, Boston, Mass., W. C. Bolt, Boston, Mass.; finance committee—J. E. Dozier, Lynn, Mass., Charles A. Record, Cambridge, Mass., B. W. Barnwell, Boston, Mass.



Electrical Versus Mechanical Troubles With Railway Motor Armatures

By JOHN S. DEAN

Railway Department, Westinghouse Electric and Manufacturing Company

IN DISCUSSING maintenance of railway equipment, with various master mechanics, representing railway operating companies throughout the country, you will find that, in general, their opinions regarding maintenance matters vary over a considerably wide range. For instance, some operators consider 40,000-mile brush life low, while others never get more than 25,000 miles and are quite well satisfied. Motor bearings on some roads average 75,000 miles, while on others they are changed every 15,000 to 20,000 miles. On some properties, 75 per cent of the armatures sent in for winding trouble are entirely rewound, the other 25 per cent are repaired; while other operators rewind 35 per cent and repair 65 per cent of the windings. The bearings of certain type motors on some roads are oiled every other night, while other master mechanics get along by oiling similar bearings every week or ten days.

These various conditions are, no doubt, brought about to a large extent by purely local conditions, such as the age of motors, service conditions, materials used, method of maintenance and inspection of equipment, grade of available labor and to the enthusiasm and progressiveness of the master mechanic in charge.

In contrast to this wide variation of opinion, regard-

ed short-circuited and open-circuited armature windings. All the other armature troubles are classified as mechanical.

NON-COMMUTATING POLE ARMATURES REPAIRED

1225 Motors—7 Types—14½ Years Average Age

Causes	Year 1916		Year 1917		Year 1918	
	Repairs per Motor per Year	Percentage	Repairs per Motor per Year	Percentage	Repairs per Motor per Year	Percentage
Mechanical	4.53	77	4.60	81	6.38	78
Electrical	1.32	23	1.07	19	1.74	22
Total	5.85	100	5.67	100	8.12	100

The above figures are plotted in the center chart.

COMMUTATING POLE MOTOR ARMATURES REPAIRED

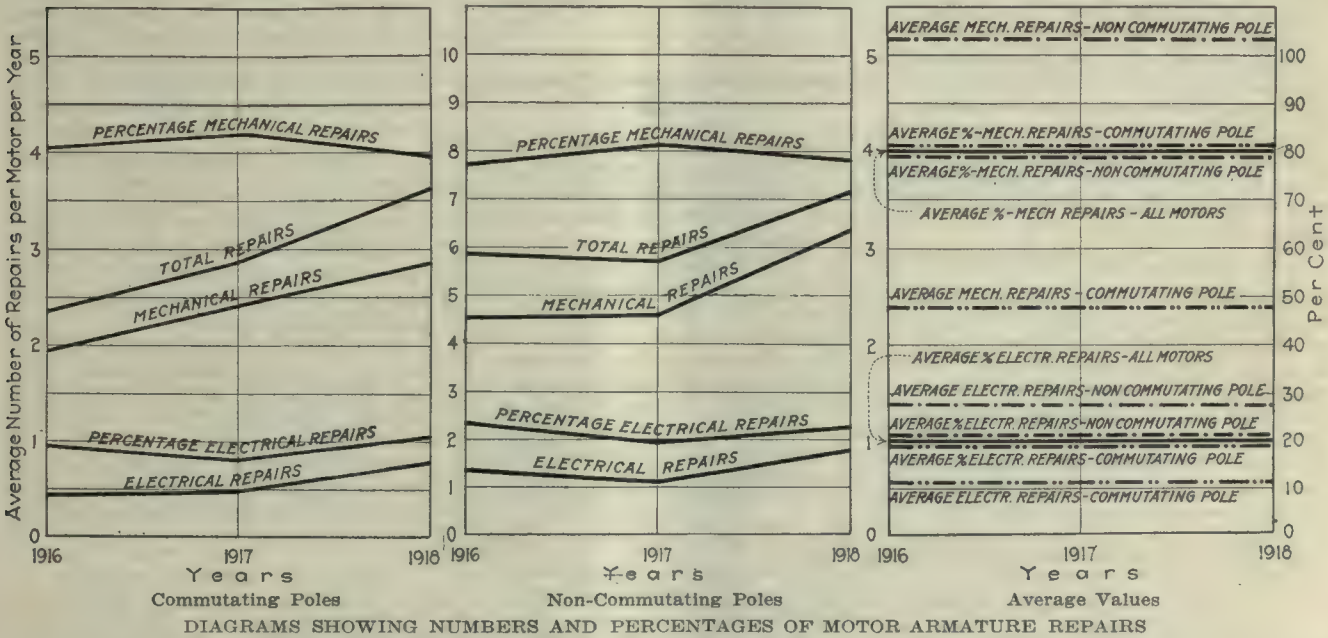
546 Motors—4 Types—4½ Years Average Age

Causes	Year 1916		Year 1917		Year 1918	
	Repairs per Motor per Year	Percentage	Repairs per Motor per Year	Percentage	Repairs per Motor per Year	Percentage
Mechanical	1.93	81	2.40	84	2.84	79
Electrical	.44	19	.47	16	.77	21
Total	2.37	100	2.87	100	3.61	100

The above figures are plotted in the left hand chart.

The data referred to have been arranged in graphical form in the accompanying charts. In these the scales for numbers are at the left in each case. The percentage scale at the extreme right applies to all three of the charts.

It is to be noted from these charts that there is quite an appreciable difference between the average number



ing questions of maintenance, there is almost a universal expression of opinion that at least 75 per cent of all railway motor troubles are due to mechanical failures. In this connection, there are available actual maintenance data on repaired armatures submitted by a large city company operating all sizes of cars, in city and interurban service, which further confirm the above general statement. These figures represent armature repairs only and are segregated so as to show this comparison on old non-commutating pole motors and on the modern commutating pole motors. Included under the heading of "Electrical Troubles" are such repairs as grounded and short-circuited commutators, also ground-

ed repairs per motor per year, both mechanical and electrical, of the commutating pole and non-commutating pole motors, which is no doubt largely due to the difference in the average ages of these respective types of motors. On the other hand, the percentages of mechanical and electrical repairs for both classes of motors are approximately the same. This would indicate that irrespective of design, size, age, operating conditions, etc., 75 to 80 per cent can be considered as a representative average figure for the mechanical troubles on railway motor armatures, and as armature troubles predominate these figures can be considered as applicable to the complete motor.



# News of the Electric Railways

FINANCIAL AND CORPORATE • TRAFFIC AND TRANSPORTATION

PERSONAL MENTION

## Relief Measures Suggested

Connecticut Commissioner Urges Trial of Other Means Before Public Ownership or State Aid

Richard T. Higgins, chairman of the Connecticut Public Utilities Commission, has issued a statement, after discussion with his associates, in regard to means of bettering the present electric railway situation. The immediate occasion for the statement was the recent beginning of the investigation of railway conditions in Connecticut.

### STATE OWNERSHIP AS LAST RESORT

While admitting without question that electric railways are in a critical condition and need some measure of assistance, Mr. Higgins would avoid, if possible, public ownership, although even that might be preferable to some methods of relief. For example, he does not believe that electric railways should be aided by special taxation or out of the public treasury.

If such assistance should ultimately be found necessary, Mr. Higgins would go still further and recommend State ownership and control, rather than require either the State or the municipalities to guarantee a specified return for privately owned railways with any form of semi-public control. In his opinion, this would be a bad and altogether too paternalistic precedent.

### A LIBERAL POLICY NECESSARY

If government ownership or State aid to the extent of directly financing operation is to be avoided, a liberal policy in regard to other means of aiding railways must be adopted. In view of the fact that present abnormal conditions will improve, the remedies adopted need not cure all present ills. Upon this basis, therefore, Mr. Higgins makes the following concrete suggestions:

1. Relieve the companies permanently of the present statutory burden of laying and maintaining street pavements.

2. Relieve them permanently from the present statutory burden in the construction of highway bridges.

3. Relieve the companies from the burden of taxation by reducing the percentage of tax on gross income, and suspend payment for a period of two years, ultimately requiring payment thereof with a low rate of interest whenever the revenues of the companies will permit, and before any dividends are paid.

4. Regulate properly jitneys or automobiles transporting passengers for hire in and along public highways, so as to eliminate unjust and unnecessary competition.

5. Amend the companies' charters to permit them to maintain and operate motor vehicles for the transportation of freight and passengers along the routes and highways over which they already have charter rights to operate electric railways, and along such other routes and highways as the Public Utilities Commission shall find to be of public convenience and necessity.

The automobile or motor vehicle is an important factor and, with the constantly improved State highways, will in the future be a still more important factor in all

kinds of short-haul or intrastate transportation. In the natural development of this kind of public service the chartered electric railway companies should have the opportunity of developing their transportation systems along such lines as the public may demand.

6. Loan to the electric railways new capital for necessary extensions and betterments, but not without the approval of the State board of control and of the Public Utilities Commission as to amount, security and general terms and conditions thereof.

If such relief is granted and at the end of two years is found to be insufficient, Mr. Higgins believes formerly successful electric railways are doomed and must be abandoned or taken over by the State and operated by the public at public expense. In his opinion, however, if there is a public demand and necessity for electric railway transportation, as he believes there is, and all other similar forms of public transportation on the highways are publicly regulated and controlled so as to avoid unreasonable or destructive competition, then electric railways, relieved of undue burdens, should be self-supporting as any business industry.

## \$1,100 to the St. Louis Conscience Fund

Restitution of \$1,100 stolen from the United Railways, St. Louis, Mo., in one year's time by a former conductor is the unique experience of Richard McCulloch, president of the company.

The first payment from the former conductor came recently in the form of a check for \$100 accompanied by a letter postmarked at a town in Iowa. In this letter the writer expressed his penitence over having taken the company's money. It was written in the same vein of other letters Mr. McCulloch has received at intervals from conscience-stricken pilferers, but in two important respects it was different being signed with the full name and address of the sender. The amount, too, was larger than the average contribution to the conscience fund.

In acknowledging receipt of the letter and the \$100 President McCulloch complimented the former conductor upon his manliness in confessing his misdeeds and making amends.

About two weeks later President McCulloch received another letter from the conductor in Iowa inclosing an indorsed negotiable note for \$1,000.

A search of the records showed that the signer of the letter was a conductor on the suburban line for about a year in 1904-1905 and according to his own confession took money which apparently he invested in Oklahoma land. There were no black marks against the man's record while with the company and he was not under suspicion.

## Government on Relief Work

Recent Conference of Mayors and Governors Seems About to Bear Fruit

Roger W. Babson of the information and educational service of the Department of Labor, and Eugene Meyer, Jr., managing director of the War Finance Corporation, are working on a government relief program for the electric railways, according to Washington reports. One of the measures which, it is hoped, will be brought about is the immediate cancellation of unnecessary taxation of the companies.

### FIVE-CENT FARE DOOMED

Mr. Babson declared on March 19 that he regarded the 5-cent fare as doomed. Cost of operation, he stated, has reached the point where companies no longer are able to keep going on the old rate of fare.

The recent conference of Mayors and Governors held in Washington apparently has spurred the government to a realization that the electric railway problem has become a matter of material importance and concern. It will be recalled that the conference adopted a resolution asking the government to investigate the traction situation and recommend relief where needed.

An appeal has been made also by the American Electric Railway Association that the government appoint a commission to investigate railway conditions and authorize measures for stabilizing the industry.

The United States Census Bureau has been getting up some electric railway figures, one of the compilations showing that seventy-two companies which had a combined net income of \$4,000,000 in 1912 experienced a deficit of \$544,000 in 1917, before war conditions had begun to affect the companies most seriously.

### RELIEF COMMISSION PLANNED

The plan of relief for the electric railways, already tentatively worked out by the Treasury Department and the Department of Labor, provides, it is stated, for a commission of five members or one representative each for the Treasury Department, Department of Labor, Department of Commerce, the banks of the country and the electric railways. Powers of the proposed commission will be similar to those of the National War Labor Board. The belief was indicated recently in government circles that the electric railway situation has become so serious that the creation of a federal body to deal with the problems of the companies practically is a certainty.



Mr. Babson is of the opinion that so far as the local railways in the District of Columbia are concerned the local Public Utilities Commission has sufficient authority to stabilize the local lines by installing a service-at-cost plan or the so-called Currier method of sliding fares and sliding dividends. Mr.

Babson will discuss in a series of articles in the *Washington Star* the practical application of such methods. He has pointed out that relief for the companies in the form of cancellation of unnecessary taxes could not be accomplished by the commission, but rather by congressional action.

## "The Good of the Service"

### The Kansas City Railways Provides New Representation and Co-operation for Employees

The Kansas City (Mo.) Railways has announced a plan, effective April 1, for bringing into one big family the new organization built up as a result of the recent strike. Following the motto, "For the Good of the Service," the company purposes to deal directly only with representatives elected by all the employees rather than with committees of any organization to which but a portion of the men belong. It is believed that with the co-operation of the employees, the present financial difficulties can be obliterated. If this can be done, it is the desire of the company that the employees shall share in the profits through increased wages and other rewards.

Every employee is urged to make suggestions. All those adopted will be suitably rewarded, and the name of the employee making the suggestion will be placed on the list of those in line for promotion. Suggestions are to be deposited in a box placed for this purpose in every department. The reward will be determined by practical working value of the suggestions.

#### COMMITTEES FOR EACH DIVISION

Committees are to be formed at each division and in every department. In the transportation and mechanical departments there shall be at each division a committee composed of two transportation employees, one mechanical department employee, the foreman of the mechanical department and the division supervisor. This committee shall meet the first Monday of each month. Recommendations are to go to the superintendent of transportation or superintendent of the mechanical department. The members of this committee, other than the mechanical department foreman and the division supervisor, may meet when necessary during the month in addition to the above to discuss upon service suggestions. This committee shall dispose of these cases either by its own action or by requesting a hearing by the supervisor.

The members of the various carhouse committees are to form the general transportation committee, which shall include the superintendent of the mechanical department and the superintendent of transportation. This committee shall hold regular meetings four times a year, recommendations arising therefrom being made to the general manager.

Similar committees shall be formed in the power, shop, electrical and track departments. Each committee shall con-

sist of the head of the department and three employees. Meetings shall be held under the same rules as those above specified for division committees.

All members of committees other than officials shall be paid their regular rate or at least \$5 per month for their time on these committees. To be eligible for committee membership an employee must have been in the service of the company for at least three years.

It is stipulated that there shall be no interference or dictation in the work of these committees from any official of the company. The committees are to be elected each year by secret ballot, any eligible man being allowed to nominate himself.

#### HANDLING APPEALS

Any employee either individually or through his carhouse committee, or the committee on its own initiative, shall, in the case of a desire to appeal from the decision of an officer, address a request direct to the superintendent of transportation, the superintendent of the mechanical department or the general manager. Those in the transportation department, after a hearing by the superintendent of transportation or superintendent of division mechanical department, may request a review by the general manager. A final appeal may be made to the president.

Each officer named is to announce a day not less than once a month at which time he shall receive any employee or committee of employees on any matter affecting the interests of the employees or "The Good of the Service."

Betterment plans now in effect, which are available to all employees and will be continued, are as follows:

A building, savings and loan association whereby employees may deposit savings and which guarantees at least 6 per cent interest in addition to accrued earnings.

Free legal aid bureau, by which any employee of the company may secure legal advice without charge.

A pension fund whereby employees who have been in the service of the company twenty years may receive a monthly sum based on average earnings and length of service for life.

The company also maintains in hospitals in the city a number of rooms which are available for the use of employees up to their capacity.

There now exists among the employees an organization known as the Kansas City Railways Employees' Brotherhood. The company is in full accord with the spirit and purposes of this organization, which provides sick and accident insurance benefits at a very low cost. The company, in order to assist its employees secure these insurance benefits, will contribute toward the cost of insurance 50 cents per month per member in accordance with the by-laws of this organization. This association is open to the employees of the company, but is not compulsory.

## Reasons for City's Purchase

### Detroit Street Railway Commission States Why Purchase Plan Was Preferable to Competition

In a statement issued by the Street Railway Commission of Detroit, Mich., the board points out that "piecemeal" construction of a railway system by the city to compete with the Detroit United Railway would be a lengthy and costly procedure and asserts that the company would combat by every means the building up of a municipal system to compete with its lines. The statement follows substantially in full:

In its deliberations, the Board of Street Railway Commissioners gave earnest consideration to the so-called "piecemeal" plan of constructing a railway, after the manner of San Francisco.

The board is conscious of the fact that many sincere advocates of municipal ownership favor this method of acquiring a street railway system, but a thorough study convinced the board that the "piecemeal" plan would be a difficult and lengthy way of improving conditions.

In the words of Mayor Couzens, the board believes, that "time is the essence of the problem."

To begin with, the Detroit United Railway is to-day in possession of the most desirable routes for street railway lines. While it is true that the city might order the company from streets where its franchises have expired, such a course would mean a cessation of service for several months, inasmuch as the railway would have three months' time to remove its tracks and restore the streets.

Should the city resort to the alternative and construct lines on parallel streets, an economic waste would result in the end, even if the Detroit United Railway was forced into bankruptcy, for unquestionably the city would wish to run its cars over the main arteries, leaving the tracks which it had constructed during warfare as waste.

It is certain that the Detroit United Railway would oppose the construction of the city system every inch of the way. This would at least result in delay, which is not desirable.

Even if the city were successful in constructing units of a system, the absence of transfer privileges with the lines of the privately owned company would prove a serious inconvenience.

In the opinion of the board, therefore, a purchase by agreement was preferable to lengthy warfare for the following reasons:

1. Provided the people ratify the purchase agreement, the city comes into immediate possession of the present system and can plan without delay for the building of extensions and the addition of cars to improve the service.

2. Lawsuits, economic waste, through construction of parallel and competing lines, are avoided, and no interruption of service is involved.

3. Experience has shown us that the longer the city delays entering into an agreement with the company, the more it will have to pay for the property. Four years ago it could have been purchased for approximately \$25,000,000, and the likelihood is that if purchase of the system is now deferred, the city will be the loser, rather than the gainer.

4. The city must plan for a comprehensive rapid-transit system. Lengthy warfare with the Detroit United Railway will postpone progress in this direction.

5. The city will be permitted to operate the railway beginning July 1, 1919, in the interest of the people of Detroit, and not in the interest of stockholders.

6. The problem which has hindered the development of Detroit for more than a score of years will be settled quickly and for all time.

In this connection it is well to recall that the question of the purchase of the property of the railway within the city by the city for \$31,500,000 as agreed mutually between the representatives of the city and the officials of the company will be presented to the voters at the election on April 7 for their approval.



## Washington Men Favored

Many Points Not Previously Agreed to Between Railway and Men Decided in Favor of Latter

With a few minor and unimportant exceptions, the National War Labor Board, in a decision made public in connection with the dispute between the Washington Railway & Electric Company, Washington, D. C., and its motormen and conductors, awards to the men all they contended for.

### MANY POINTS SETTLED PREVIOUSLY

Fourteen disputed points had been agreed to by the contending parties before the matter was submitted to Joint Chairmen Taft and Manly for final adjudication. These points, at the request of the men, were incorporated in the award. The award provides substantially as follows:

The company is to meet and treat with duly accredited committees representing the men on all questions and grievances which may arise.

There is to be no discrimination by the company against men on account of union affiliations or membership in any labor organization.

Properly accredited representatives of the men who have duties to perform in connection with the office to which they are properly elected are to be given leave of absence by the company to attend to such duties.

If a man is suspended or discharged without sufficient cause he is to be restored to his former position without loss of pay.

All schedules are to be made with a view to furnishing the best possible working conditions, and straight runs, whenever practicable, are to be given the men.

No regular assigned run is to pay less than eight hours a day.

The company is to pay straight time for all swings of one hour or less than one hour.

Where men report for duty and begin their run they are to receive pay for full time, whether the run is completed or not.

Men holding runs that do not appear on holiday or Sunday schedules are not to be required to report on such days except under unusual conditions.

The wages for motormen and conductors are fixed at 43 cents an hour for the first three months, 46 cents for the next nine months and 48 cents thereafter.

The men will be permitted to post notices in each car and in other ways protect themselves against possible imposition.

Motormen and conductors will receive pay for the time necessary for them to go to the general office and make reports.

The requests not granted by the board relate to additional pay for operating hand-brake cars, time and a half for intervening time, twenty minutes for meal relief, ten minutes for turning in car receipts and free passes. In this connection the board said:

These requests are not granted and no change is required in the present practice in regard to these specific matters.

### AWARD EFFECTIVE IMMEDIATELY

The award is to take effect immediately and will continue until the end of the war, "as announced by executive proclamation." Either party, however, may reopen the case before the board at periods of six months' interval beginning Oct. 1.

The board was silent on the request of W. McK. Clayton that it pass on the question of whether the people of Washington should be made party to the dispute. Mr. Clayton filed a brief in which he declared that as the Wash-

ington Railway & Electric Company is a public utility corporation and as the people must pay any additional expenses assumed by the company through an advance in wages or a reduction in working hours, they ought to be heard in any contention between the parties.

## Missouri Commissioners Reappointed

The Senate of Missouri has confirmed the reappointment of William G. Busby, chairman of the Public Utilities Commission of Missouri, and Edwin J. Bean, as members of the commission. Both were reappointed for a term of six years. Announcement has also been made that R. P. Spencer, St. Louis, actuary of the State Insurance Department, will succeed A. Z. Patterson as chief counsel for the commission.

## Utility Bills Before Legislature

No less than twenty bills affecting public utilities have been introduced in the Legislature of Illinois. Several of these bills are for the complete repeal of the public utilities act, but so far these do not seem to have met with favor. Another bill amends the public utilities act by defining taxicab drivers and operators as a public utility whether or not transportation is over a definite route, or between fixed terminals, while still another defines motor-bus and motor transportation lines operating between two or more cities as a public utility, and subject to the provisions of the public utility act.

A bill known as the home rule municipal league measure provides that any city or municipality may elect by franchise ordinance, when referred to the people at a regular or special election and receiving a majority of the votes cast, to withdraw from the jurisdiction of the commission, and regulate the public utilities within its boundaries. The act further provides that cities may go back under the commission by the same procedure.

A bill which greatly curtails the powers of the commission provides that nothing in the public utilities' act shall give the commission the power or authority to revise, alter or modify in any way contracts entered into in good faith between municipalities and public utilities, or the conditions of any franchise, license or permit to engage in business in any such municipality as a public utility.

There is also a bill for the protection of streets, roads and highways of the State by prescribing the maximum loads, rate of speed and width of tires of commercial motor vehicles used thereon. From the standpoint of the electric railways this measure does not seem to go far enough, and it is felt that a bill should be passed which would require motor transportation companies operating over the highways of the State to pay compensation for the use of the roads, either on a mileage or per-ton basis.

## Honolulu Wants a New Deal

Honolulu has a franchise problem, for which the Honolulu Rapid Transit & Land Company, through its president, L. T. Peck, is seeking a solution. The present franchise was granted in 1898 for thirty years by the government of Hawaii to local people who took over from foreign interests the then existing indifferent tramways and merged, modernized and extended them, carrying out improvements far beyond the requirement specified in the new grant. Provision was made in the franchise grant to the new company for a capital stock sinking fund, definite contributions to which from earnings were to take precedence to the right of the government to any part of the company's income. Deposits to this fund, however, have long been diverted to extensions. The time has come now when this can no longer be done if the interests of the stockholders are to be properly protected and the company has announced that henceforth it proposes "to fulfill to our stockholders the duty of protecting them by making all possible deposits to such fund."

This policy if put into effect will work materially to the disadvantage of the city by throttling the work of expansion carried out by the company in the past and this is being pointed out by Mr. Peck to the local authorities. Honolulu needs further additions to its transit system, but the company cannot carry its liberal policy of the past any further unless it is put into a position to do so. This is generally realized in some quarters and the Governor has already recommended to the 1919 Legislature the enactment of an appropriate bill to settle the franchise matter so that a franchise act acceptable to the city and the company can be sent on to Washington for confirmation. Mr. Peck has summarized the franchise conditions necessary to insure a continuation of the policy of expansion which has been in effect in the past. In this connection he said in a recent public statement:

The extended franchise should be flexible enough in its terms as to rates and government charges, under commission control, that the revenues will always be sufficient to provide the very best of service and a fair return on the capital already invested and on that yet to be sought for immediate and future expansions.

## War-Time Privilege Withdrawn

The Council of Danville, Ill., has canceled an ordinance made for the period of the war which allowed the Illinois Traction System to haul coal through the streets at all times during the day and night. The original ordinance provided that coal be hauled only between the hours of midnight and 6 a.m. The demand for coal became so urgent during the winter of 1917-1918 and the difficulties of transportation so great that the Councils of Danville, Champaign, Urbana and other cities in which the Illinois Traction Company operates allowed cars of coal to be hauled at any time.



## Seattle Is on Trial, Says Mayor Hanson

It is announced that the *remittitur* in the State Supreme Court hearing to test the legality of the deal for the purchase of the railway property of the Puget Sound Traction, Light & Power Company by the city of Seattle, will be filed on April 6. It is announced that the company will be ready to turn over the property any time after that date. It is understood the date of actual transfer depends only on the time required in signing the 15,000 utility bonds issued in payment for the lines. Mayor Ole Hanson has been forced to take a vacation and Acting Mayor W. D. Lane will fall heir to the job of signing 13,400 of the bonds.

In his message to the City Council before leaving the city, Mayor Hanson urged co-operation in all departments of the city government, and particularly with the handling of the railway problem. He said in part:

If you play petty politics and refuse to establish fares that in all experience have proved necessary; if you make for votes and not for service, naught but disaster can overtake the municipal railway venture. If, on the other hand, we give the people of Seattle service and charge a fair rate, and use our best business judgment, our municipal-owned system will prove a beacon light to other cities throughout the country.

## No Bluffing Here

Too often electric railway companies crying aloud for succor are considered to be "bluffing" and instead of the fabled bread are handed a stone in their trouble. To this fact Norton, Mass., is just awaking. The story of the Norton, Taunton & Attleboro Street Railway, Norton, Mass., is best told perhaps by the following dispatch from that city to the *Pawtucket Times*:

Many people believed that the threat to discontinue the road was a bluff and was something that would never occur, but certain facts brought out during the past few days leave the plain truth that the road must be sold within a very short time to satisfy the orders of the Comptroller in Washington, and the matter is entirely out of the hands of the bondholders, the agents of the road or even the town and city officials, through whose communities the line passes. A bank in Lowell that held 70 per cent of the bonds of the road failed about four years ago and at that time paid only 90 per cent to the depositors. As the bank was under national supervision the Comptroller has ordered the road sold so that the other 10 per cent may now be paid the depositors. A junk dealer has been over the line and offered \$120,000, but the sale is being withheld as long as possible to allow the municipalities or private citizens to make as large a bid so that the line will be left for the use of the public. In 1917 the road was assessed for \$240,000. Coming from a federal officer the order to sell must be taken seriously and the voters will have a chance to cast one of the most important votes of their lives at the special meeting which will be called shortly.

## Chicago Wage Question Reviewed

The wage situation on the Chicago (Ill.) Surface Lines has been summed up by the *Chicago Tribune* as follows:

It is understood to be the view of attorneys for the Chicago Surface Lines that with the ending of the war the increased wage scale will, in equity, automatically terminate. It is not expected that the War Labor Board will recommend a reduction

to the former level, but it will become a question for the companies in the surface lines to take under consideration.

The companies in June, 1917, entered into a contract with the employees running for three years, or until June, 1920. In this contract increases in wages were provided for amounting to a total of about \$1,000,000 a year. This contract has until June of next year to run, and it is held by the companies that with the end of the war there will be a reversion to conditions under the original contract.

There is not at this time any suggestion as to what the companies will do. They merely assert that the occasion for the increase of \$3,700,000 will have passed with the signing of the peace treaty and that they will be under no legal obligation to continue the existing scale of wages.

## News Notes

**Wants Labor Ruling Modified.**—The Louisville (Ky.) Railway has asked for a modification in the ruling of the War Labor Board, fixing a minimum wage of 40 cents an hour for common labor.

**Sioux City Men Want More.**—Trainmen of the Sioux City (Iowa) Service Company have served notice on the company that when the present wage scale agreement expires on May 1 they will demand a flat increase of 15 cents an hour. They are receiving 30 and 35 cents under the present agreement.

**Louisville Camp a Permanent Site.**—The investment in equipment installed to connect Camp Taylor with Louisville, Ky., will probably be converted from a temporary to a permanent asset to the Louisville Railway as it has been announced from Washington that the camp will be one of fifteen permanent federal military posts.

**City May Acquire Outside Lines.**—The Senate of the State of Washington has passed Representative Guie's bill authorizing the extension and operation of municipally-owned electric railways to a point not to exceed 8 miles outside of its corporate limits. The bill will enable the city of Seattle to acquire the Seattle & Rainier Valley Railway.

**Wants Appropriation for Rapid Transit Work.**—The Public Service Commission for the First District of New York has asked the Board of Estimate of New York City to appropriate \$577,060 for rapid transit expenses during the second quarter of the year. This amount will provide for the expansion of the number of employees for the purpose of rushing plans for the remaining work, so that contracts may be let at the earliest moment. Only by making some such provision, the commission has pointed out, can the remaining portions of the dual system be rushed to completion.

**Professor Richey Accepts.**—Prof. Albert S. Richey has accepted his designation as the city's representative on the board of arbitration which will try to effect an agreement between the International Railway, Buffalo, N. Y., and

the city whereby the local lines of the International will be placed under municipal control. Mr. Richey and James E. Allison, Jr., St. Louis, the company's representative, have held several informal conferences and efforts are now being made to agree upon a third member of the board. The designation of the third member is expected to be made within the next ten days.

**Company Is Opposed to Franchise Modification.**—A refusal to consent to amendments to the Tayler grant was made by President John J. Stanley of the Cleveland Railway at the first of a series of daily meetings to consider the railway proposition. Coupled with this refusal was the assertion by Mr. Stanley that he would prefer municipal ownership and operation of the company's property to an amended franchise ordinance. The session ended abruptly a half hour after it convened, but another meeting will be held when amendments proposed by Mayor Davis will be laid before executives of the company.

**War Record of Byllesby Properties.**—The third edition of the National Service Record of H. M. Byllesby & Company and affiliated companies shows an increase of 256 men in the service since July 1, 1918, making a total of 951 so engaged, or 19 per cent of the organization's male employees. Only twenty casualties are recorded, nine deaths, ten wounded men and one man missing in action. On Jan. 1, 1919, 270 men had been engaged overseas and 112 had returned to civil life. More than \$2,500,000 was subscribed by the organization and its employees to the four Liberty Loans, more than \$66,000 was invested in war savings certificates and thrift stamps, and they gave more than half a million dollars to various charities.

## Programs of Meetings

### New York Electric Railway Association

The thirty-seventh annual meeting of the New York Electric Railway Association will be held at the Fort William Henry Hotel, Lake George, on June 7.

### Southwestern Electrical & Gas Association

At a meeting of the executive committee of the Southwestern Electrical & Gas Association held on March 17 it was decided to hold a three-day convention on May 12, 13 and 14. The morning of the first day will be devoted to committee meetings, and the mornings of the other two days to separate operating sessions of the gas, electric light and power, and the street and interurban railways. In the afternoons of all three days will be general sessions. A general convention committee was appointed with A. Hardgrave as chairman. A banquet will be held on one of the evenings of the convention and will be in charge of a local committee from Galveston and Houston.



# Financial and Corporate

## P. R. T. Expenses Rise

Increase of \$3,252,000 in Operating Expenses but Gain of Only \$1,977,000 in Gross Earnings for 1918

The first annual report of the Philadelphia (Pa.) Rapid Transit Company since the change of its fiscal year to the calendar period shows what is called an abnormal increase in gross earnings of \$1,977,501 or 6.65 per cent for 1918. This gain was due to war-time activities. The passenger earnings rose \$1,947,606 or 6.80 per cent.

of approximately 12½ miles, and to put the road into operation between these points at the earliest possible moment.

The new company will issue \$200,000 of common stock and \$200,000 of twenty-year 6 per cent gold bonds, with interest payable semi-annually, the first interest payment to be made on Jan. 1, 1920. The bonds are to be sold to the subscriber on a basis of \$100 par value of bonds and \$25 par value of stock for each \$100 in cash.

One hundred and fifty thousand dollars of the stock of the company is to

COMPARATIVE INCOME STATEMENT OF PHILADELPHIA RAPID TRANSIT COMPANY FOR YEARS ENDED DEC. 31, 1917 AND 1918

	1918		1917	
	Amount	Per Cent	Amount	Per Cent
Gross passenger earnings.....	\$30,568,788	96.42	\$28,621,182	96.28
Receipts from other sources.....	1,135,639	3.58	1,105,744	3.72
Total earnings.....	\$31,704,427	100.00	\$29,726,926	100.00
Maintenance and renewals.....	\$4,755,664	15.00	\$4,459,039	15.00
Operation of power plants.....	2,719,097	8.58	2,061,904	6.94
Operation of cars.....	8,951,880	28.24	7,494,130	25.21
General.....	2,071,744	6.53	1,529,196	5.14
Taxes.....	1,871,186	5.90	1,573,269	5.29
Total expenses.....	\$20,369,571	64.25	\$17,117,538	57.58
Net earnings from operation.....	\$11,334,856	35.75	\$12,609,388	42.42
Interest.....	\$2,314,649	7.30	\$2,260,310	7.61
Rentals.....	7,365,391	23.23	7,365,393	24.78
Sinking fund—city contract.....	120,000	0.38	120,000	0.40
Total fixed charges.....	\$9,800,040	30.91	\$9,745,703	32.79
Surplus.....	\$1,534,816	4.84	\$2,863,685	9.63

The operating expenses, however, were excessively high in 1918, owing to the enormously increased cost of both labor and material, and represented an increase of \$3,252,032 or 19 per cent. The fixed charges showed a net increase of \$54,336, caused mainly by payment of interest on passenger cars secured by lease from the government. The surplus for the year was but \$1,534,816, as compared to \$2,863,684 for 1917.

Dividends were declared from the surplus earnings as follows: Payable July 31, 1918, 2½ per cent, \$749,645, and payable Jan. 1, 1919, 2½ per cent, \$749,645. The full comparative income statement for the last two calendar years is given in the accompanying table.

A considerable part of the annual report is devoted to a striking résumé of results obtained during the past eight years of Statesbury-Mitten management. A summary of information on this point was published in the *ELECTRIC RAILWAY JOURNAL* of March 8, page 484.

## Plan to Reclaim Richmond & Chesapeake Bay Railway

It is proposed to organize the Richmond-Ashland Railway, Richmond, Va., for the purpose of purchasing the right-of-way, rails, etc., from the Richmond & Chesapeake Bay Railway from Ashland to Laburnum station, a distance

be issued to J. L. Vaughan, president of the Petersburg & Hopewell Electric Railway, and his associates, who agree to advance such additional funds as may be necessary for the maintenance and operation of the road during a period of five years. These stockholders, in their individual capacity, guarantee to operate the road, and further guarantee to provide payment of interest on the bond issue for a period of two years should the earnings of the road not be sufficient.

The funds secured from the sale of the bonds are to be used for corporate purposes and requirements only, and the subscribers to the bonds and stocks are to have representation upon the board of directors.

In order that the proposed plan shall become operative subscriptions equal to \$150,000 cash must be received before any subscriptions are binding. As soon as subscriptions to the sum of \$150,000 cash have been received, 50 per cent of such subscriptions are to become due and payable immediately to the American Trust Company, Richmond, as trustee. Upon the organization of the company the remaining 50 per cent will be payable to the trustee. In the event the organization of the company is not perfected, and the property is not purchased within ninety days, the trustee is to return all subscriptions to the subscribers.

## Skimming Off Financial Slag

All Rhode Island Companies Likely to Go Into the Melting Pot and Come Out a Complete Amalgam

A bill asking for a charter for a new corporation to take over the whole or any part of the electric railway system of Rhode Island has been presented in the Rhode Island Legislature. The measure was drawn by Attorney-General Rice with the full consent and approval of all the interests concerned in the present complicated affairs of the Rhode Island Company. The presentation of the bill was made in order that authority might be obtained from the Legislature before its adjournment, as another session will not be held until 1921.

## CONFERENCE ON REORGANIZATION

Frank H. Swan, Theodore Francis Green and Zenas W. Bliss, receivers of the Rhode Island Company, conferred on March 24 with the representatives of the various interests and the proposed reorganization of the company was thoroughly discussed. Attorney-General Herbert W. Rice represented the State of Rhode Island; Mayor Joseph H. Gainer represented the city of Providence, the other representatives being Walter F. Angell of the law firm of Edwards & Angell, representing the protective committee of stockholders of the United Traction & Electric Company; Michael F. Dooley, representing the protective committee of the bondholders of the Rhode Island Suburban Railway; Richard B. Comstock, representing the bondholders of the United Traction & Electric Company; Philip Spalding, of Estabrook & Company, Boston, chairman of the protective committee of the United Traction bondholders; and Nathaniel W. Smith, representing the New York, New Haven & Hartford Railroad, which owns the capital stock of the Rhode Island Company.

It was the consensus of opinion at the conference that a complete reorganization of the company with the establishment of one company owning all the trackage and privileges of the present numerous lessor companies, as indicated recently in the *ELECTRIC RAILWAY JOURNAL*, was the only solution to the problem.

## MAYOR WANTS CORPORATE STRUCTURE SIMPLIFIED

Mayor Gainer of Providence advocated the amalgamation of all the various units of which the company is at present composed into one company and the simplification of its organization so that the public could appreciate its position and obligations. He urged an immediate reduction of the capitalization as essential to the restoration of public confidence and he declared that the people would pay any fare necessary to maintain service if they felt that the fares were equitable and the necessary result of the service furnished.



He said, moreover, that the city was prepared to lend its assistance in every way possible and was also willing to make sacrifices and concessions, but he demanded that the other interests affected indicate a similar spirit. The company is at present required to pay the city in franchise taxes and new paving charges approximately \$160,000 annually but this income the city would surrender if by so doing the reorganization of the company could be expedited and benefited.

Mayor Gainer's exposition of the city's attitude stirred the conference to concrete action and at the request of the receivers the representatives of the various interests at the conference were requested to constitute a general committee to perfect plans for a complete reorganization of the company and pre-

sent it to the receivers at the earliest date possible.

Although the Superior Court, through Presiding Justice Tanner, must pass on any plan of reorganization before it can become operative, it was deemed advisable to secure the necessary authority from the Legislature to reorganize, and accordingly Attorney-General Rice was requested to draw up a bill and present it in anticipation of approval of the reorganization by the court.

Mayor Gainer's statements relative to the concessions the city would make were not made on his own initiative, as he had conferred before the conference with the members of the City Council committee on Rhode Island Company affairs and had been vested with full authority to speak for the city.

## Another Receiver in New York

### Holding Company for Rapid Transit and Surface Lines Unable to Meet April 1 Interest Payment

James R. Sheffield was appointed receiver for the Interborough Consolidated Corporation, New York, N. Y., on the afternoon of March 21 by Judge Julius M. Mayer, in the United States District Court at New York. The appointment was made following the filing of an involuntary petition in bankruptcy by Alexander & Green, attorneys, holders of collateral 4 per cent bonds of the corporation.

#### CONTROLS RAPID TRANSIT AND SURFACE LINES

The Interborough Consolidated Corporation is a holding company. It controls approximately 97 per cent of the stock of the Interborough Rapid Transit Company; 85 per cent of the stock of the New York Railways which recently went into a temporary receivership, and 45 per cent of the stock of the New York Transportation Company, which operates the Fifth Avenue omnibuses.

The Interborough Consolidated Corporation has never received a dividend from its holdings of New York Railways stock. Up to the close of 1916 the New York Railways succeeded in keeping up interest payments on its adjustment mortgage income bonds, but it contributed no revenue to the holding company, which derived its entire income from its ownership of 339,128 shares of Interborough Rapid Transit Company stock. Dividends at the annual rate of 20 per cent were paid on the Interborough Rapid Transit stock, enabling the Interborough Consolidated Corporation to meet the interest on the \$67,825,000 Interborough-Metropolitan 4½ per cent bonds and pay dividends of 6 per cent on Interborough Consolidated preferred. In July, 1918, the Interborough Rapid Transit dividend was cut to 10 per cent. This necessitated the passing of Interborough Consolidated preferred dividend. In February the dividend on Interborough Rapid Transit stock was also passed, cutting off the source of revenue

from which Interborough Consolidated met the interest in the Interborough-Metropolitan bonds. A semi-annual interest instalment of \$1,526,062 is due on these bonds on April 1.

It was on evidence that the interest payment just mentioned would not be met that the petitioning creditors based their right to act. The Interborough Consolidated Corporation was alleged to be liable for interest owed on these bonds as the result of the consolidation of the Interborough-Metropolitan Company and Finance & Holding Corporation. Evidence of the bankruptcy of the Interborough Consolidated Corporation was presented in the form of a transcript of the minutes of the meeting of the board of directors.

The general grounds for the petition are given as follows:

Your petitioner is informed that the condition of the alleged bankrupt's affairs and business is such as to render it absolutely necessary that a receiver be appointed at once to take the custody and possession of the said securities, bonds and certificates of stock which are now in the possession or under the control of the alleged bankrupt pending the issue of the bankruptcy proceeding, for the reason that the semi-annual instalment of interest on the collateral trust 4½ per cent gold bonds of the Interborough-Metropolitan Company, of which \$62,776,000, principal amount, are outstanding and widely distributed, will be due and payable by said alleged bankrupt on April 1, 1919, and that said alleged bankrupt, as your petitioner is informed and verily believes, will be unable to pay the same, with the result that the said bonds, securities and certificates of stock now in the possession of or under the control of said alleged bankrupt may be subjected to or in danger of efforts to levy on or attach the same by the holders of said bonds or some of them attempting to enforce the payment of said instalment of interest to the prejudice of a fair and equitable distribution of said assets pro rata among the creditors entitled to receive the same.

The following securities in the possession of the bankrupt or within its control are listed:

150,610 shares of the capital stock of the New York Railways of the aggregate par value of \$15,061,058.

532 shares capital stock of the Forty-second Street & Grand Street Ferry Railroad, par value \$53,200.

Six first mortgage bonds of the Bleeker Street & Fulton Ferry Railroad Company, par value \$6,000.

One 5 per cent bond of the Broadway Surface Railroad, par value \$1,000.

Six per cent mortgage bonds of the Jerome Park Railway, par value \$100,000.

First and refunding mortgage bonds of the Twenty-eighth & Twenty-ninth Street Crosstown Railroad, par value \$1,378,000.

55 shares of the capital stock of the Third Avenue Railroad, par value \$5,500.

The alleged bankrupt has pledged as collateral the following securities, all of which are not now in its possession or under its control:

339,128 shares capital stock of the Interborough Rapid Transit Company, aggregate par value \$33,912,000.

103,128 shares capital stock of the New York Transportation Company, aggregate value \$1,035,740.

United States 4½ per cent second Liberty bonds, par value \$600,000.

The petitioners assert that the bankrupt owns bills receivable and claims for accrued interest and dividends of unknown value and has cash on hand amounting to \$49,000.

Job E. Hedges, who is receiver of the New York Railways, which as previously stated is controlled by the Interborough Consolidated Corporation, has issued the following statement:

The questions involved in the receivership of the New York Railways are serious and of great importance not only to those interested as bondholders and claimants, but to the general public. I have no preconceived notion whatever in the matter, and approach the duties of the receivership with a fallow and receptive mind. My first duty is to ascertain the facts, and this will be done to the best of my ability. I shall attempt to form no opinion until I have all the facts in mind, and then they will be placed before the court.

The income of the New York Railways for the fiscal year ended June 30, 1918, fell more than \$150,000 short of meeting the interest requirements on the first real estate and refunding mortgage bonds. In the six months ended Dec. 31, 1918, the corporate deficit reached \$2,125,039 and all special and reserve funds were exhausted.

The New York Railways has outstanding \$17,495,060 capital stock. Mortgage indebtedness of the New York Railways is as follows:

First real estate and refunding mortgage.....	\$18,061,289
Adjustment mortgage.....	\$0,609,487
Convertible scrip.....	2,250

The outstanding mortgages on property of companies owned and operated by the New York Railways are as follows:

Lexington Avenue & Pavonia Ferry Ry.....	\$5,000,000
Columbus Avenue & Ninth Avenue R.R.....	3,000,000
Broadway Railway.....	1,500,000
South Ferry R.R.....	350,000
Central Crosstown Ry.....	250,000

Mortgages against lines leased by the New York Railways are:

Broadway & Seventh Avenue R.R., first consolidated mortgage.....	\$8,150,000
Christopher & Tenth Street R.R.	210,000
Twenty-third Street Ry., improvement and refunding mortgage.....	1,500,000
Bleeker Street & Fulton Ferry R.R.....	700,000
Thirty-fourth Street Crosstown Ry.....	1,000,000

The New York Railways operates more than 150 miles of trackage in the borough of Manhattan. It was incorporated at the close of 1911 as successor to the Metropolitan Street Railway, which was sold under foreclosure.



## Loss of 12 Per Cent in Net Income

### Statistics of Electric Railways for 1918 Show Disastrous Effect of Higher Costs—East Better Off in December

Operating returns of electric railways for 1918, as reported to the information bureau of the American Electric Railway Association, show large increases in those items which managers like to see decrease. In the accounts where an increase would mean a healthy growth in prosperity and the prevalence of normal conditions, however, there is a discouraging decrease occurring uniformly throughout the country.

#### NET FELL 12 PER CENT

The accompanying tables show the returns for 1918 as compared with 1917, and the returns for December, 1918, as compared with the corresponding month of 1917. Table I, giving

the figures for the year, shows that for the country as a whole the revenues increased 6.45 per cent. Expenses during the same period, however, increased 15.74 per cent, producing a decrease in net earnings of 12.26 per cent. For companies reporting taxes the figures are nearly the same, the decrease in the net being 10.40 per cent. An increase in the taxes produced a decrease in operating income of 13.42 per cent.

That the progress of unfavorable conditions has not yet been arrested is indicated by the returns for December, 1918, as compared with the same month of 1917. Table II makes this comparison. Operating expenses for the country as a whole increased 22.58 per cent, while the net earnings fell off 3.90

per cent. Companies reporting taxes showed an increase in revenues of 7.57 per cent, an increase in expenses of 21.92 per cent and a decrease in net earnings of 33.46 per cent. Taxes decreased 32.67 per cent, and the net income suffered a decline of 33.96 per cent.

The operating ratio for 1918 for companies operating 5107 miles of line was 72.65 per cent as compared with a ratio of 66.82 per cent for the same companies in 1917. Companies operating 3799 miles of line report taxes, and the operating ratio of these companies in 1918 was 73.06 per cent, an increase of 5.05 per cent over 1917 for the same companies.

#### SIGNS OF GAIN IN EAST

The Eastern district showed the only signs of improvement, especially in the returns for December, 1918. The more favorable showing is accounted for by

TABLE I—COMPARISON OF REVENUES AND EXPENSES OF ELECTRIC RAILWAYS FOR CALENDAR YEARS 1917 and 1918

Account	United States				Eastern District				Southern District				Western District			
	Amount, January-December, 1918	Per Mile of Line			Amount, January-December, 1918	Per Mile of Line			Amount, January-December, 1918	Per Mile of Line			Amount, January-December, 1918	Per Mile of Line		
		1918	1917	% Increase Over 1917		1918	1917	% Increase Over 1917		1918	1917	% Increase Over 1917		1918	1917	% Increase Over 1917
Operating revenues.....	\$111,688,563	\$21,870	\$20,545	6.45	\$54,554,582	\$19,222	\$17,955	7.00	\$11,407,529	\$15,343	\$14,136	8.54	\$45,726,462	\$29,977	\$28,486	5.23
Operating expenses.....	81,192,846	15,889	13,728	15.74	39,973,194	14,084	12,155	15.87	7,665,957	10,311	8,473	21.69	33,553,695	21,997	19,215	14.48
Net earnings.....	30,495,717	5,981	6,817	↓12.26	14,581,388	5,138	5,800	↓11.42	3,741,572	5,032	5,663	↓12.74	12,172,767	7,980	9,271	↓15.92
Operating ratio, per cent.....		1918, 72.65; 1917, 66.82				1918, 73.27; 1917, 67.70				1918, 67.20; 1917, 59.94				1918, 73.38; 1917, 67.45		
Av. No. miles of line.....		1918, 5,107; 1917, 5,107				1918, 2,838; 1917, 2,838				1918, 743; 1917, 743				1918, 1,525; 1917, 1,525		

#### COMPANIES REPORTING TAXES

Operating revenues.....	\$100,014,301	\$26,325	\$24,741	6.40	\$49,059,914	\$24,033	\$22,460	7.00	\$5,346,149	\$20,354	\$18,401	10.61	\$45,608,248	\$30,505	\$28,970	5.30
Operating expenses.....	73,074,000	19,234	16,827	14.31	36,128,085	17,698	15,611	13.37	3,536,456	13,464	10,917	23.33	33,409,459	22,346	19,525	14.44
Net earnings.....	26,940,301	7,091	7,914	↓10.40	12,931,829	6,335	6,849	↓7.60	1,809,693	6,890	7,484	↓7.94	12,198,789	8,159	9,445	↓13.61
Taxes.....	6,761,245	1,780	1,765	0.85	3,169,712	1,553	1,596	↓2.69	414,567	1,578	1,470	7.34	3,177,566	2,125	2,048	3.76
Operating income.....	20,179,056	5,311	6,134	↓13.42	9,762,117	4,782	5,253	↓8.97	1,395,126	5,312	6,014	↓12.67	9,021,223	6,034	7,397	↓18.43
Operating ratio, per cent.....		1918, 73.06; 1917, 68.01				1918, 73.64; 1917, 69.50				1918, 66.15; 1917, 59.33				1918, 73.25; 1917, 67.39		
Av. No. miles of line.....		1918, 3,799; 1917, 3,800				1918, 2,041; 1917, 2,042				1918, 263; 1917, 263				1918, 1,495; 1917, 1,495		

† Decrease.

TABLE II—COMPARISON OF REVENUES AND EXPENSES OF ELECTRIC RAILWAYS FOR DECEMBER, 1917 AND 1918

Account	United States				Eastern District				Southern District				Western District			
	Amount, December, 1918	Per Mile of Line			Amount, December, 1918	Per Mile of Line			Amount, December, 1918	Per Mile of Line			Amount, December, 1918	Per Mile of Line		
		1918	1917	% Increase Over 1917		1918	1917	% Increase Over 1917		1918	1917	% Increase Over 1917		1918	1917	% Increase Over 1917
Operating revenues.....	8,903,746	1,825	1,695	7.67	4,805,173	1,693	1,538	10.08	1,229,030	1,653	1,470	12.45	2,869,543	2,215	2,167	2.22
Operating expenses.....	7,362,468	1,509	1,231	22.58	3,797,060	1,338	1,235	8.34	881,531	1,186	886	33.86	2,683,877	2,071	1,419	45.95
Net earnings.....	1,541,278	316	464	↓31.90	1,008,113	355	303	17.16	347,499	467	584	↓20.03	185,666	144	748	↓80.75
Operating ratio, per cent.....		1918, 82.68; 1917, 72.63				1918, 79.03; 1917, 80.30				1918, 71.75; 1917, 60.27				1918, 93.50; 1917, 65.48		
Average number miles of line.....		1918, 4,878; 1917, 4,878				1918, 2,839; 1917, 2,839				1918, 743; 1917, 743				1918, 1,296; 1917, 1,296		

#### COMPANIES REPORTING TAXES

Operating revenues.....	7,707,574	2,159	2,007	7.57	4,330,134	2,121	1,922	10.35	517,803	1,971	1,688	16.77	2,859,637	2,260	2,211	2.22
Operating expenses.....	6,472,219	1,813	1,487	21.92	3,437,317	1,684	1,576	6.85	363,409	1,384	992	39.52	2,671,493	2,111	1,445	46.09
Net earnings.....	1,235,355	346	520	↓33.46	892,817	437	346	26.30	154,394	587	696	↓15.66	188,144	149	766	↓80.65
Taxes.....	486,798	136	202	↓32.67	295,443	145	179	↓18.99	26,527	101	122	↓17.81	164,828	130	256	↓49.22
Operating income.....	748,557	210	318	↓33.96	597,374	292	167	74.85	127,867	486	574	↓15.33	23,316	19	510	↓98.76
Operating ratio, per cent.....		1918, 83.97; 1917, 74.09				1918, 79.40; 1917, 82.00				1918, 70.22; 1917, 58.77				1918, 93.41; 1917, 65.36		
Average number miles of line.....		1918, 3,569; 1917, 3,570				1918, 2,041; 1917, 2,042				1918, 263; 1917, 263				1918, 1,265; 1917, 1,265		

† Decrease.



the improved operating conditions resulting from better weather during December, 1918.

Compared with 1917, the figures show an increase in operating revenues for 1918 of 7.00 per cent and an increase in expenses of 15.87 per cent. The net earnings fell off 11.41 per cent, while the operating ratio increased from 67.70 per cent to 73.27 per cent. For companies reporting taxes the net earnings decreased 7.50 per cent. Taxes also declined 2.69 per cent, and the operating income dropped 8.97 per cent.

The improvement in the November returns for the Eastern district, noted in the *ELECTRIC RAILWAY JOURNAL* of March 1, showed up more strongly in the December returns. Revenues increased 10.08 per cent, while expenses increased only 8.34 per cent. As a result there was a gain in net earnings of 17.16 per cent. The operating ratio in this district also showed an improvement, declining from 80.30 per cent in December, 1917, to 79.03 per cent in December, 1918.

For companies reporting taxes the returns were still more favorable. Revenues increased 10.35 per cent while expenses were increasing 6.85 per cent, producing an increase in net earnings of 26.30 per cent. Taxes on the other hand fell off 18.99 per cent, and the result was the extraordinary increase in operating income of 74.85 per cent. This improvement was also reflected in the operating ratio, which dropped from 82.00 per cent in December, 1917, to 79.40 per cent in December, 1918.

#### CONDITIONS DISCOURAGING IN WEST

Compared with the figures for the East, those for the Western district present a startling contrast. The revenues increased only 5.23 per cent, the smallest increase in the country, while operating expenses increased 14.48 per cent, producing a falling off in net earnings of 13.92 per cent. The operating ratio rose from 67.45 per cent in 1917 to 73.38 per cent in 1918. For companies reporting taxes the net earnings fell off 13.61 per cent. Taxes increased 3.76 per cent, while the operating income dropped 18.43 per cent. The operating ratio for these companies increased from 67.39 per cent to 73.25 per cent.

The returns for December would seem to indicate that the worst has not yet come in this district, although the limit is fast approaching. The operating ratio climbed from 65.48 per cent in December, 1917, to 93.50 per cent in December, 1918. It is probable, however, that this extremely bad showing was caused by the influenza epidemic, which lingered longer in the West than in any other section of the country. This explanation gains strength from the fact that the operating revenues in this district increased only 2.22 per cent, while the average increase for the whole country was 7.67 per cent. Operating expenses increased 45.95 per cent, and the net earnings decreased 80.75 per cent. Owing to a decrease in taxes, the companies reporting taxes make a more

favorable showing. With the same increase in revenues, expenses increased 46.09 per cent, and net earnings decreased 80.55 per cent. Taxes declined 49.22 per cent, and operating income fell off 62.75 per cent.

#### EXPENSES MOUNT RAPIDLY IN SOUTH

The outstanding feature in the Southern district is the increase in operating expenses. For 1918 this increase was the largest in the country, being 2.69 per cent for all companies reporting and 23.33 per cent for companies reporting taxes. The net earnings decreased 11.14 per cent for all companies, while for companies reporting taxes the decrease was 11.67 per cent. The taxes of these latter companies increased 7.34 per cent, and their operating income declined 11.67 per cent. The operating ratio in this district for all companies reporting was 67.20 per cent for 1918 as compared with 59.94 per cent for 1917.

The figures for December seem to indicate that conditions are still growing

worse. Although the Southern District had the greatest increase in revenues, 12.45 per cent for all companies and 16.77 per cent for companies reporting taxes, the operating expenses were second only to the West in the amount of their increase, being 33.86 per cent for all companies reporting and 39.52 for companies reporting taxes. The net earnings for the former fell off 20.03 per cent, while for the latter the decline was 15.66 per cent. Taxes decreased 17.21 per cent, and the operating income of these companies decreased 15.33 per cent. The operating ratio for the district rose from 60.27 in December, 1917, to 71.75 per cent in December, 1918.

The returns shown in detail in the tables on page 664 have been classified as follows: Eastern District—East of the Mississippi River and north of the Ohio River. Southern District—South of the Ohio River and east of the Mississippi River. Western District—West of the Mississippi River.

## Experience of Twelve Lines

### Statistics for Large Surface and Rapid Transit Lines Show Effect of War-Time Conditions

Monthly reports on the earnings and expenses of electric railways throughout the country, compiled by the information bureau of the American Electric Railway Association and published from time to time in the *ELECTRIC RAILWAY JOURNAL*, have shown the gradual approach of many properties toward bankruptcy. To show still further the effect of war-time conditions on such companies, some figures are presented herewith summarizing the results on twelve large properties—six city surface lines, three rapid transit lines and three combined surface and rapid transit lines.

These twelve utilities in 1918 operated 4555 miles of single track, or almost one-tenth of the total electric railway mileage in the United States. They hauled 4,240,674,009 revenue passengers and, with transfer and free passengers included, a grand total of about 6,000,000,000 passengers. The following statistics do not give the full story of an entire year under the most trying circumstances, because the figures from five of the properties are for the twelve months ended June 30, 1918. It must be remembered that the new wage scales, which became a serious burden on operating expenses, were effective for only part of the calendar year. Five of the properties still have a fare of 5 cents, two have 6 cents, one has 8 cents, two have zone systems and one charges 1 cent for each transfer plus a 5-cent fare.

The gross earnings of the surface companies showed an increase of 3.5 per cent over the previous year, while the lines which include rapid transit facilities gained 3.8 per cent. In the operating expenses (including taxes) there was an increase of 11.6 per cent

for the surface properties and 17 per cent for the rapid transit. The operating ratio for the former averaged 77.34 per cent, ranging from 65.79 to 85.05, while for the latter it averaged 66.78 per cent, ranging from 48.39 to 89.79 per cent. To show the difference where only subway or elevated figures are concerned, the operating ratio for three such companies was 60.74 per cent in 1918 as compared to 51.34 per cent in 1917.

#### SERVICE GAGED TO TRAFFIC

It was to be expected that the companies would gage their service to meet the traffic which was offered. The revenue car-miles showed a decrease of 1.7 per cent for surface lines and an increase of 0.04 per cent for rapid transit. The revenue passengers showed a decrease of 1.8 per cent for surface and an increase of 1.4 per cent for rapid transit companies. Revenue car-hours were practically in the same proportion, which meant that there was no appreciable change in the speed during the year. A more favorable showing in miles per hour is to be expected in the next annual reports, owing to more or less extended adoption of skip-stop practice late in the fiscal year.

The average fare for all the revenue passengers carried was exactly 5 cents, while in the previous year it was 4.8 cents. A still better showing may be looked for next year when the increased rates have been in force longer.

Owing to the fact that some of the companies do not keep account of transfer and free passengers, a true statement of total passengers per mile of single track cannot be presented. The available figures, however, show



that there was a decrease of 2 per cent for surface lines and 1.1 per cent for rapid transit companies. The number for the former properties ranged from 739,052 to 2,251,999, while for the latter they amounted to from 1,112,870 to 1,293,439.

An index of the use of rolling stock is to be found in the item of annual miles operated per car. This, of course, is affected by the average speed. The average for surface lines was 35,299 miles and for rapid transit companies 42,045 miles, both showing an increase in the performance of cars over the previous year. In this connection it should be stated that there was a decrease of about 2 per cent in the maximum number of cars operated daily by these companies.

Some statistics of these twelve large properties are given in the following table:

STATISTICS PER CAR-MILE AND PER CAR-HOUR FOR TWELVE ELECTRIC RAILWAYS

	Six Surface Roads	Six Rapid Transit Roads
Transportation revenue per car-mile (cents).....	32.2	29.2
Expenses and taxes per car-mile (cents).....	21.4	20.0
Transportation revenue per car-hour (cents).....	\$2.76	\$3.55
Expense and taxes per car-hour (cents).....	\$2.17	\$2.42

## Boston Loss \$285,124

Cost Per Passenger Rises to 9.30 Cents in February with Receipts at 8.15 Cents—Labor Costs 4.19 Cents

The financial report for the month of February, just made public by the trustees of the Boston (Mass.) Elevated Railway, shows that the cost was 9.304 cents for each passenger carried. Of this total the cost of labor was 4.191 cents. The receipts per revenue passenger, who numbered 24,879,938, were 8.158 cents.

The net loss for February was \$285,124 as compared to a loss of \$219,629 in January and a loss of \$149,903 in December. The average loss for the three months during which the 8-cent fare has been in effect is \$218,219 a month. This compares with an average loss of \$604,148 a month for the four months of the 7-cent fare and with a loss of \$707,958 in July under the 5-cent fare.

The total receipts from all sources for February, 1919, were \$2,029,734. Of this amount \$1,978,313 came from the 8-cent fare. The receipts from this fare, as compared with the 5-cent fare in February, 1918, show an increase of 44.85 per cent or \$613,113.

The total cost of service for February, 1919, was \$2,314,858. Of this amount \$1,042,695 was expended for wages—an increase over February, 1918, of \$369,943. The total cost of service for February shows an average per passenger of 9.304 per cent as compared with 8.970 per cent in January and 8.914 per cent for the six months ended with December. Details of the

cost for February, 1919, are given herewith:

		Cost per Passenger (cents)
Operating expenses:		
Labor.....	\$1,042,695	4.191
Contracts, material and other items.....	232,990	.937
Damages and insurance.....	76,759	.309
Depreciation.....	167,000	.670
Coal.....	148,494	.597
Total operating expenses.....	\$1,667,938	6.704
Taxes.....	77,093	.310
Interest on unpaid taxes.....	2,694	.011
Miscellaneous.....	1,492	.006
Rent for use of property: Subway and tunnel rents to city.....	123,662	.497
Leased roads rentals.....	215,785	.867
Interest on bonds and notes.....	109,198	.439
Dividends under acts of 1918.....	116,997	.470
Total cost of service.....	\$2,314,859	9.304

The income statement for February, 1919, is given below:

RECEIPTS AND COST OF SERVICE OF BOSTON ELEVATED RAILWAY FOR FEBRUARY, 1919

Receipts:	
From fares.....	\$1,978,313
From special cars, mail pouch service, express and service cars.....	7,510
From advertising in cars, on transfers, privileges at stations, etc.....	24,637
From other railways for use of tracks and facilities.....	3,227
From rent of buildings and other property.....	5,381
From sale of power and other revenue.....	7,433
Total receipts from direct operation.....	\$2,026,501
Interest on deposits, income from securities, etc.....	3,233
Total receipts.....	\$2,029,734
Cost of service:	
Maintaining track, line equipment and buildings.....	\$153,423
Maintaining cars, shop equipment, etc.....	206,682
Power (including 24,990 tons of coal at \$5.942, or \$148,494).....	222,635
Depreciation.....	167,000
Transportation expenses (including wages of car employees, carhouse expenses, etc.).....	747,129
Salaries of administrative officers.....	6,875
Law expenses, injuries and damages, and insurance.....	94,175
Other general expenses.....	70,018
Total operating expenses (of which \$1,042,695 represents wages).....	\$1,667,937
Taxes, proportion.....	77,093
Rent for leased roads (exclusive of subways).....	215,785
Proportion of rent for subways and tunnels to be paid to city exclusive of Cambridge Subway owned by company.....	123,662
Interest on Boston Elevated bonds and notes.....	109,198
Miscellaneous items.....	1,492
Proportion of dividends under acts of 1918.....	116,997
Interest on unpaid taxes.....	2,694
Total cost of service.....	\$2,314,858
Net loss.....	\$285,124

## New Jersey Tax Measure

The New Jersey House has voted to change the 1918 law by which the tax on public utility properties was assessed on the gross receipts at the average rate of taxation in lieu of all personal tax apportioned on the same basis of franchise tax, to a system of making all receipts taxable, on private rights-of-way as well as on highways, in lieu of exemption of personal property, and on bridges and viaducts, formerly taxed as real estate. The new act will increase the returns from 12 to 15 per cent.

## Financial News Notes

**Receiver for Tucson Company.**—The Tucson (Ariz.) Rapid Transit Company has been placed in the hands of Edwin F. Jones, a Tucson attorney, as receiver on the application of the Tucson Gas, Electric Light & Power Company, a creditor holding notes against the company for \$62,062.

**File Your Rhode Island Claim.**—The receivers of the Rhode Island Company, Providence, R. I., acting under orders of the Superior Court of Rhode Island, have announced that the period for filing all claims against the company will expire on May 1. The receivers, Frank H. Swan, Theodore Francis Green and Zenas W. Bliss, have been instructed by the court to present as soon as convenient after May 1 a complete list of all claims against the company.

**May Discontinue One Louisville Line.**—The Louisville (Ky.) Railway will probably discontinue its Main Street line regardless of pending argument over fare increase. Main Street business organizations are making an effort to secure steam lines and switches through Main Street. This is a progressive measure that would be a general aid to the city, and probably reduce operating expenses to a point where income would be increased, without material reduction in service.

**Tacoma Municipal Line Running Behind.**—City Comptroller John Roberts of Tacoma, Wash., in a recent report to the Council, gives figures to show that the tideflats municipal railway is not earning operating expenses, and that no earnings are available to pay the interest on outstanding bonds or to provide for depreciation. The total income for February from the operation of the railway was \$7,580. After paying interest and caring for depreciation charges, there was a deficit of \$3,591.

**Approves \$30,000 Stock Issue.**—The Board of Public Utility Commissioners of New Jersey has dismissed the application of the Public Service Railroad, Newark, N. J., for approval of the issuance of \$60,000 of its capital stock at par, but has approved of the issuance of \$30,000 of stock. The company is a subsidiary of the Public Service Corporation. It operates the fast line between Newark and Perth Amboy and Trenton. The companies merged into it included the Trenton Terminal Railroad and the Elizabeth, New Brunswick & Trenton Railroad.

**San Francisco Reorganization Progress.**—The San Francisco Chronicle said recently: "The committee which has in hand the reorganization of the United Railroads is still at work, and, according to Jesse W. Lilienthal, president of the company, is making real progress.



Mr. Lilienthal said that he hoped there would soon be an announcement to make, which he felt sure would be highly gratifying to all interested in seeing the problems of the company in a fair way of settlement. There had, he said, been a disposition among those concerned to get together, and work that had been accomplished by the committee was such that a comparatively short time would bring results."

**Another Rhode Island Deficit.**—A deficit of \$90,000 for the month of January is shown in the monthly statement of the Rhode Island Company, Providence, R. I., filed with the Public Utilities Commission. This is an increase of \$30,000 over the deficit for the corresponding month of 1918. The total gross income is given as \$558,711 and total expenses \$654,435, causing a deficit of \$95,724. Operating revenues for the month amounted to \$558,078, an increase of \$78,737 over the corresponding period of the year before. Operating expenses, however, increased \$79,627 in the same period and totalled \$478,911, leaving a net operating revenue of \$79,166 or less than \$1,000 below the 1918 figure.

**Galveston-Houston Electric Sells Gold Notes.**—Lee Higginson & Company, Boston, New York and Philadelphia, recently offered for subscription at 98½ and interest yielding 7.55 per cent \$1,500,000 of Galveston-Houston Electric Company three-year 7 per cent secured gold notes dated March 1, 1919, and due March 1, 1922. The proceeds of the notes are to be used to provide for the retirement of the company's entire floating debt incurred for additions and improvements and for all necessary requirements during 1919. The notes are the direct obligation of the Galveston-Houston Electric Company and are secured by the deposit of \$1,800,000 of general mortgage 7 per

cent bonds of the three operating companies.

**Bay State Sale Set for April 21.**—At the County Court House for Essex County in the city of Salem, Mass., Channing H. Cox, special master, on April 21 will sell "all property of every character, nature, and description, and wheresoever situated, of the Bay State Street Railway and of its receiver, and all interests of every character, nature, and description of the Bay State Street Railway and of its receiver, in property, other than cash, cash assets, claims, credits, accounts and items receivable." The sale will be conducted under the final order made on March 22 by the District Court of the United States for the District of Massachusetts. The terms of the proposed reorganization of the company have been reviewed previously in the *ELECTRIC RAILWAY JOURNAL*.

**Interurban Places Short-Term Notes.**—Robert Garrett & Sons, Baltimore, Md., are offering at 97½ and interest, to yield 7 per cent, \$450,000 of three-year 6 per cent bond-secured gold notes of the Charleston (W. Va.) Interurban Railroad. The notes are dated March 15, 1919, and are due on March 15, 1922. They are in denominations of \$1,000 and \$500. The trustee of the issue is the Safe Deposit & Trust Company, Baltimore. Interest is payable on March 15 and Sept. 15. The notes are secured by the deposit of \$500,000 of first mortgage 5 per cent bonds of the Kanawha Valley Traction Company, due on Jan. 1, 1946, part of a total authorized issue of \$2,000,000, of which \$1,700,000 are outstanding. For each \$750 of notes, \$1,000 of bonds is pledged as security.

**Not to Recover B. R. T. Bonds.**—A memorandum was filed on March 24 by Judge Julius M. Mayer, in the United States District Court, regarding the

hearing on March 22, on the application of ex-Judge Lindley M. Garrison, receiver of the Brooklyn (N.Y.) Rapid Transit Company, for instructions as to bringing suits to recover possession of \$29,000,000 of bonds pledged as collateral. The question at issue was as to whether this course should be taken where no arrangement has been made to prevent having the bonds thrown on the market regardless of any upset price. Judge Mayer holds that the transactions in question were bona fide and in accordance with business usages and should be regarded as valid, particularly because the other course would at the present time be likely to disturb public confidence. No such actions will accordingly be brought by the receiver.

**Changes in American Cities Company.**—According to the New Orleans *Item* the affairs of the American Cities Company are now largely in the hands of local New Orleans interests. That paper said recently: "At the meeting of the shareholders of the American Cities Company, the bondholders committee, headed by J. K. Newman, New Orleans, was placed in control of its affairs. It is understood that possibly until after plans of reorganization of the New Orleans Railway & Light Company have taken shape, the management and control of the American Cities Company will be in the hands of directors representing the bondholders, with J. K. Newman active head of the company. The new board of directors is composed of F. T. Homer, New York; J. K. Newman, Arsene Perrilliat, E. H. Bright, H. M. Walmsley, D. H. Saunders, F. B. Hayne, C. P. Ellis, L. H. Dinkins and F. B. Williams, New Orleans; Percy Warner, Nashville; J. S. Pevear, Birmingham; D. H. Cantrell, Little Rock; E. D. Parker, Houston; T. H. Tutwiler, Memphis; C. H. Harvey, Knoxville; Robert Jamison, Birmingham; J. H. Caldwell, Philadelphia.

## Electric Railway Monthly Earnings

### BANGOR RAILWAY & ELECTRIC COMPANY, BANGOR, ME.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Jan., '19	\$82,595	\$57,690	\$24,905	\$20,306	\$4,599
1m., Jan., '18	77,776	50,169	27,607	19,659	7,948
12m., Jan., '19	927,891	604,257	323,634	239,741	83,893
12m., Jan., '18	889,212	509,310	379,902	229,376	150,526

### BATON ROUGE (LA.) ELECTRIC COMPANY

1m., Jan., '19	\$31,272	\$17,157	\$14,115	\$3,988	\$10,127
1m., Jan., '18	21,529	11,117	10,412	3,695	6,717
12m., Jan., '19	277,551	152,693	124,858	46,721	78,137
12m., Jan., '18	233,048	120,553	112,495	42,866	69,629

### CAPE BRETON ELECTRIC COMPANY, LTD., SYDNEY, N. S.

1m., Jan., '19	\$52,190	\$36,958	\$15,232	\$6,727	\$8,505
1m., Jan., '18	41,428	33,257	8,171	6,535	1,636
12m., Jan., '19	523,767	396,111	127,656	78,698	48,958
12m., Jan., '18	466,928	308,294	158,634	78,635	79,999

### CHATTANOOGA RAILWAY & LIGHT COMPANY, CHATTANOOGA, TENN.

1m., Jan., '19	\$146,323	\$115,019	\$31,304	\$21,938	\$9,366
1m., Jan., '18	133,002	110,805	22,197	30,698	18,501
12m., Jan., '19	1,853,600	1,442,175	411,425	295,175	116,250
12m., Jan., '18	1,384,980	1,174,262	210,718	360,510	149,792

### CUMBERLAND COUNTY POWER & LIGHT COMPANY, PORTLAND, ME.

1m., Jan., '19	\$215,722	\$157,530	\$58,192	\$56,689	\$1,503
1m., Jan., '18	231,606	213,338	18,268	70,882	152,614
12m., Jan., '19	3,211,015	2,245,307	965,708	844,929	120,778
12m., Jan., '18	3,074,814	2,103,030	971,784	825,116	146,669

\* Includes taxes. † Deficit.

### EAST ST. LOUIS & SUBURBAN COMPANY, EAST ST. LOUIS, ILL.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Jan., '19	\$366,418	\$298,797	\$67,621	\$69,013	\$1,392
1m., Jan., '18	299,688	263,009	36,679	65,730	129,051
12m., Jan., '19	4,282,618	3,339,107	943,511	816,571	126,940
12m., Jan., '18	3,699,552	2,549,728	1,149,824	787,047	362,777

### EL PASO (TEX.) ELECTRIC COMPANY

1m., Jan., '19	\$127,963	\$90,427	\$37,536	\$7,013	\$30,523
1m., Jan., '18	114,360	74,781	39,579	6,513	33,067
12m., Jan., '19	1,271,235	885,956	385,279	81,582	303,698
12m., Jan., '18	1,281,542	811,408	470,134	68,276	401,858

### GALVESTON-HOUSTON ELECTRIC COMPANY, GALVESTON, TEX.

1m., Jan., '19	\$242,487	\$181,518	\$60,969	\$40,525	\$20,444
1m., Jan., '18	194,182	132,913	61,269	39,282	21,987
12m., Jan., '19	2,739,636	1,898,855	840,781	473,878	366,903
12m., Jan., '18	2,119,228	1,404,568	714,660	453,252	261,408

### LEWISTON, AUGUSTA & WATERVILLE STREET RAILWAY, LEWISTON, ME.

1m., Jan., '19	\$78,070	\$75,237	\$2,833	\$19,995	\$17,162
1m., Jan., '18	47,120	73,004	25,884	15,911	14,795
12m., Jan., '19	925,734	793,339	132,395	231,694	199,299
12m., Jan., '18	883,790	702,500	181,290	187,292	16,002

### NASHVILLE RAILWAY & LIGHT COMPANY, NASHVILLE, TENN.

1m., Jan., '19	\$272,317	\$191,031	\$81,286	\$39,941	\$41,345
1m., Jan., '18	204,521	131,562	72,959	41,037	31,922
12m., Jan., '19	2,934,009	1,956,335	977,674	480,560	497,118
12m., Jan., '18	2,452,973	1,587,706	865,267	489,869	375,394



# Traffic and Transportation

## Appeals to Its Employees

### Connecticut Company Asks Its Employees to Make Suggestions for Improvements

Under date of March 15 the Connecticut Company, New Haven, Conn., issued the first of a series of monthly bulletins which it intends to send to all officers and employees of the company. The first bulletin contains four pages. It is concluded with an appeal to the employees for suggestions. The last two pages are left blank except for the lines "I believe the service of the Connecticut Company on the \_\_\_\_\_ division would be improved if attention were given the following matters." The circular is signed by President L. S. Storrs. The text is as follows:

There never was a time when the Connecticut Company stood in greater need of the utmost efficiency from its executives and employees than the present.

We need the effort of every man and woman to win the good-will of the public.

Public good-will pays us our wages. Without public good-will street cars cannot operate, and if the street cars do not operate we are deprived of our present means of livelihood.

#### COURTESY AND EFFICIENCY

Attention to business and common sense breed efficiency; efficiency brings good-will, and the most valuable component of efficiency is courtesy.

We who operate the cars of the Connecticut Company, whether we be conductors, motormen, track employees, superintendents, managers, clerks or general officers, must bear in mind that our personal success and the success of the Connecticut Company depend on our individual attitude toward the people who ride on our cars.

Every person who pays us a fare, or hands us a ticket or a transfer, is paying us for service, and is entitled to efficient, courteous service.

There will be persons unreasonable and discourteous toward us, who may be insolent and who will try our patience, but nevertheless our duty is to keep our tempers, to listen to complaints, to correct deficiencies in service and to do everything we can to make friends for ourselves and our company.

Never indulge in a noisy argument with a passenger.

Courteous treatment of the public is an all-important element of good service.

Discourtesy, gruffness, insolence on the part of employees will not be tolerated by the public nor by the officers of our company.

Men handling the money of the Connecticut Company are under a heavy obligation to their fellow employees and to the public, as well as under the highest moral obligation to themselves.

#### FAIRNESS TO ALL

Superintendents, managers and officers are under the obligation to deal with those in their departments with absolute fairness, honor and tact, and to act on constructive criticism and helpful suggestion from the public.

We are all in one big family.

We must work together—we must work with our brains as well as our bodies to conserve every resource, every cent of income in order that our company may establish itself soundly, and build up a great spirit of helpfulness on the part of the public—the public good-will so vital to our success.

From time to time you will receive communications from your company. You will be told how things are going with us, how we are succeeding, how we are falling down.

Give our problems your best thought;

give the public your best service; work your brain as well as your body.

Working together we'll win public favor and personal success.

P. S.—We invite you to use the next sheet to send us suggestions that probably have occurred to you for the betterment of our service. Feel free to write exactly what is in your mind—we want helpful criticism and earnest suggestions.

There is an addressed envelope herewith in which you can seal your suggestions, and leave with the foreman or other person to whom you report, or, if you prefer, you are free to mail it direct.

## Conference on Spokane Fares

Two conferences were held on March 14 by city officials of Spokane, Wash., and the officials of the Washington Water Power Company and the Spokane & Inland Empire Railroad in an effort to reach an agreement on the demand of the companies for an increase in fares. At the close of the conference the City Commissioners announced that they had declined to agree to the plan for an increase. In fact, Commissioners Fleming and Tilsley said that they thought further conferences useless and that the companies should now place their propositions in writing before the City Council.

In substance the modified proposals of the railways are:

To raise the fare from 5 cents to 6 cents. Estimated increase in revenues, \$160,000, for both systems.

Period for which the 6-cent fare is to operate on trial, approximately one year.

Added revenues to be applied to wage increases for the men, betterment of service and the elimination of present deficits in operating expenses. The wage increases for Washington Water Power Company employees alone are estimated at \$50,000.

The railway officials explained that a 1-cent increase in fare, if traffic remained constant, would produce \$200,000, or 20 per cent on the present basis of receipts. However, traffic is not expected to remain at its former volume, and on this account the increase in fare is expected to yield not more than \$160,000. The railway officials would not agree to return to the 5-cent fare after the one year of trial. The City Commissioners declined to be committed to any policy where it is proposed permanently to abandon the 5-cent fare.

In the event that no agreement is reached, it is possible that the Public Service Commission may be asked to put into operation the fare increase to which the City Commissioners would not agree.

After three conferences with city officials and representatives of the railway companies Chairman E. F. Blaine of the State Public Service Commission announced that the interested parties had been unable to agree and that the application of the companies for an increase of fare to 7 cents and 1 cent additional for transfers in accordance with their original request for relief had been set for hearing for March 31 in Spokane.

## Six-Cent Fare Compromise

### Public Utilities Commission Will Decide as to Necessity of Charging Higher Fare in Vancouver

Until such time as the Public Utilities Commission decides that 6 cents is too much that fare will continue to be charged on the Vancouver lines of the British Columbia Electric Railway. Should the commission, however, find that the fare ought to be 5 cents, the extra cents collected during the period from April 9 next to the date on which the judgment becomes effective, will not go to the company's treasury but to the Vancouver General Hospital. Such in effect is the compromise reached at Victoria by the representatives of the City Council in respect of a clause in the public utilities bill.

On the occasion of the strike last July the city granted the British Columbia Electric Railway the right to levy a 6-cent fare for nine months, the understanding being that by the end of that period either the Public Utilities Commission would decide what the fare should be or the city and the company would work out a new franchise agreement good for five years. So far even the public utilities bill has not been submitted to the Legislature, while efforts to reach an agreement on the franchise were abandoned some time ago.

The Council was proposing to pass a new by-law restoring the 5-cent fare next month—the former by-law being operative after April 9 unless repealed—when it was found that the draft of the public utilities bill contained a clause which fixed fares at the rates now in operation until such time as the commission should change them. As the commission might consume many months in its inquiry before returning a finding the City Council protested against the city being saddled with the 6-cent fare all that time when, if they judge the situation correctly, the commission would find in the end that only 5 cents was justified.

Mayor Gale said that Attorney-General Farris had refused to delete the clause but proposed to modify it by providing that the amount of fares received in excess of 5 cents should be paid into a trust fund and held in escrow, to be recovered by the companies concerned should the higher fares be sustained, and to be paid into the funds of designated public institutions should it not. In the case of Vancouver the general hospital was named as the contingent beneficiary.

## Fare Conference in Louisville

Several conferences have been held recently between Mayor George Smith of Louisville, Ky., and President Minary of the Louisville Railway, relative to a proposed increase in fares. No formal request has been made to the city by the company as yet, and neither the city nor the railway has made any statement.



## Iowa Company Sustained

**Court Upholds Des Moines Service Cut for Approval of Which Supervisor Was Dismissed**

Judge Martin J. Wade of the Federal Court has decided unreservedly in favor of the Des Moines (Ia.) City Railway in its claim that a cut in service is necessary in order to meet the conditions forced by a failure to receive a rate increase. In announcing his decision Judge Wade said:

The receivers claim that the annual deficit of the company is \$216,000. It is clearly the duty of the court to stop this loss.

The people of Des Moines will get every dollar's worth of service they are entitled to. Nothing could be worse than dragging these matters along. The one thing in controversy here is a matter of bookkeeping. Service must be diminished in order that the deficit be stopped. Roy Smock was railway supervisor for the city on Feb. 24 when he signed the new service schedules. The court will not attempt to take any of the power conferred upon him away from him. There is nothing before the court to indicate that the company did not act in good faith. If there is any question of this sort it is between Byers (city attorney) and Smock. If it could be shown that the proposed cuts were in excess of necessity I would not allow them. The new schedule will go into effect temporarily. This is not a final matter. There may be modifications from time to time and the court will be open to a showing at any time. The city and the company should co-operate with each other and it is the city's duty to be interested in the company's. Therefore I grant the order.

Judge Wade further declined to take up the city's demands that the pavements near railway tracks be repaired.

Late in February after securing the approval of Mr. Smock, the railway supervisor for the city, the Des Moines City Railway announced a material cut in service. The City Council thereupon discharged Mr. Smock and secured an injunction from the Polk County District Court holding up the service cut. Judge Wade was then brought into the case and told the District Court to "keep its hands off." Then the railway petitioned the Federal Court for the relief desired in the service cut and the decision to which reference has just been made is the result. The service curtailment will go into effect at once.

## Service Resumed

After a period of considerable electioneering activity, a new Mayor and several other members of Council were elected for Burlington, Ont., on Feb. 3, says the *Canadian Railway & Marine World*, with the result that on Feb. 5 the Hamilton Radial Electric Railway resumed service between Hamilton and Oakville, 21.46 miles. The agreement with the Burlington Council as to fares to be charged supersedes for a year the provisions in the original franchise, and provides as follows:

Workman's ticket for twelve trips, good for one week, Burlington to Hamilton terminal and return, \$1.50, and to Sherman Avenue, \$1.20.

Hamilton commutation tickets, to and from Hamilton, good for twenty-six trips within six weeks, \$4.50 each, or a rate of 35 cents for return trip.

Transient tickets, one way 25 cents, return 45 cents.

School tickets to be sold at the same price as formerly.

Ratification of this agreement is to be made by the company, the Burlington Council and the Board of Railway Commissioners, and the proceedings in connection therewith are in progress.

A full schedule put in effect on Feb. 20 provides for an hourly car service from 6.10 a.m. to 11.10 p.m. every week day, and from 9.10 a.m. to 10.10 p.m. on Sundays; while there is a service from Burlington to Hamilton at 6 a.m. and 7 a.m., the regular hourly service starting from Oakville at 7.30 a.m. and continuing to 10.30 p.m., except on Sundays, when the last car to Hamilton leaves at 9.30 p.m. There is a car leaving Oakville for Burlington at 11.30 p.m. (daily) and another at 12.30 a.m. (daily except Sunday), and on Sundays only a car from Oakville to Burlington is run at 10.30 p.m.

## Boston Zone Trial Postponed

The trustees of the Boston (Mass.) Elevated Railway have decided to defer the trial of the zone system for the following reasons:

1. Because they believe that the 8-cent fare, collected as far as possible by the metal tokens, should be given a further trial.

2. Because there is now pending before the Legislature a bill which proposes to amend the law so that the trustees cannot adopt the zone system. This bill reads as follows:

"Sec. 2 of Chap. 159 of the special acts of 1918, providing for the management of the Boston Elevated Railway by trustees shall not be construed to confer upon the trustees the right to establish a zone system of fares, and no zone system or other system which provides for the collection of more than one fare for a continuous passage shall be put in operation upon the said railway."

3. There is also pending before the Legislature the bill proposed by Senator Walsh, which provides for a return to the 5-cent flat fare; the amount of the deficit to be raised in the general tax levy in the districts served by the company, and in connection with which bill the Supreme Court is asked to determine the constitutionality of the act under which the trustees are operating.

4. The operating changes necessary to give the zone system a trial would involve a large expenditure of money, and it is obviously improper for the trustees to spend this money while such legislation is pending.

5. If the zone system is to be tried, the test should be made under the most favorable circumstances, and the trustees are advised by Prof. A. S. Richey that a zone system can be given a fairer trial during the summer months.

It was originally proposed to start the zone system on April 1.

## New Jersey Fare Ordered Reduced

The Board of Public Utility Commissioners of New Jersey on March 26 ordered the Public Service Railway, Newark, N. J., to reduce its fares from 7 cents to 6 cents on April 1. The company is permitted to charge 1 cent for transfers.

The decision was reached at a special session held in Newark to pass upon the request of the company for a zone plan of fares. Mayor Gillen of Newark attacked the company bitterly. He was called upon by the commission, following his tirade, to furnish the regulating body with facts and not opinions.

The hearing on the zoning system was postponed until March 27 to give counsel of the various municipalities time to study the plan. T. N. McCarter, president of the railway, said that with the 6-cent fare the net loss of the company for the first six months of this year would be \$145,041. He also declared the recent strike had cost the company approximately \$200,000.

The decision just rendered by the commission is in accordance with the ruling which it made on Sept. 27, 1918. At that time the commission in order that the company might meet the higher wages then recently ordered by the War Labor Board, authorized the railway to charge 7 cents instead of 5 cents from Oct. 15 to March 31, inclusive, and 6 cents from April until such time as the "war emergency" ceased to exist. In connection with the new rates, the company was permitted to continue to collect 1 cent for all initial transfers. The 1-cent transfer charge was originally put into effect as provided in an order issued by the commission last July. In the meantime it was proposed that an inquiry should be conducted into the question of a zone system of fares as perhaps affording a more equitable plan of meeting the financial needs of the company.

## Interurban Telephone Talks

Fred C. Mayer, traffic manager of the Arkansas Valley Interurban Railway, Wichita, Kan., relates the following in explanation of "Why Interurban Railway Employees Go Crazy":

Telephone rings—

Lady—"Interurban?"

Agent—"Yes, Mam!"

Lady—"When's the last limited to Hutchinson?"

Agent—"Four o'clock!"

Lady—"When's that car git back?"

Agent—"No limited cars back to-night!"

Lady—"Yes, but when's the lass limited car leave here?"

Agent—"I said four o'clock!"

Lady—"Yes, but when's the lass limited git back?"

Agent—"I said no more limited to-night!"

Lady—"Say, when's the four o'clock limited come back?"

Agent—"Five thirty in the mornin'!"

Lady—"Oh!"

Telephone rings again:

Voice—"When's the first car to Hutchinson?"

Agent—"Five thirty in the mornin'!"

Voice—"When's the nex?"

Agent—"Six forty!"

Voice—"An' the nex?"

Agent—"Every hour, twenty minits!"

Voice—"When ju say?"

Agent—"Eight aklock!"

Voice—"Every hour after?"

Agent—"NO, every hour twenty minits!"

Voice—"Why dinnu say so!"

Agent—"Oh, Hell!"



## Houston Sustained in Its Fare Fight

The city of Houston, Tex., won the second point in its fight with the Houston Electric Company, which operates the railway in Houston, when the Court of Civil Appeals at Galveston sustained the decision of Judge Dannenbaum of the Sixty-first District Court. Judge Dannenbaum sitting at Houston had sustained the general demurrer of the city of Houston to the company's mandamus proceeding to compel the city to enforce the repealed ordinance passed last fall providing for a 6-cent fare in Houston, with half fares for students and children under twelve years of age.

C. R. Wharton, counsel for the Houston Electric Company, stated that the fact that Judge Pleasants dissented gave the company the privilege of applying to the Supreme Court for a writ of error. He said that would be done.

In sustaining the general demurrer of the city, Judge Dannenbaum took the ground that he could not go beyond the ordinance of Nov. 6, which repealed the ordinance of Sept. 30, granting the 6-cent fare, unless it was shown that the 5-cent fare was unreasonable and confiscatory. This, the company has not done up to the present time.

The 6-cent fare ordinance was passed upon by the City Council after application had been made by the company for a 7-cent fare. A few days before the ordinance went into effect, a petition bearing a sufficient number of signatures was presented to the City Council, asking for the matter of rates to be submitted to a referendum vote. This was granted and on Nov. 5 a majority voted against the 6-cent fare. The Council then held a meeting and repealed the 6-cent fare ordinance, restoring the 5-cent rate.

## Transportation News Notes

**Fare Tariff Suspended.**—The proposed increase in rates for railway service in Freeport, Ill., by the Illinois Northern Utilities Company has been suspended by the Public Utilities Commission of Illinois until July 13.

**Eight Cents for Carlisle.**—An order permitting the Cumberland Railway Carlisle, Pa., to charge an 8-cent fare was issued on March 14 by the Public Service Commission. The 8-cent fare was announced after a 7-cent fare had been in effect for a time.

**Jitney Measure in Washington Unchanged.**—The measure introduced in the recent Legislature at Olympia, Wash., providing for the regulation of jitney and motor cars for hire in large communities by placing them under con-

trol of the Public Service Commission, was indefinitely postponed. The jitney law will thus remain as it is.

**Oshkosh Would Rescind Paving Charge.**—The city authorities of Oshkosh, Wis., have agreed to relieve the Eastern Wisconsin Electric Company of the obligation to pay for the first cost of paving, and the renewal thereof, upon the ordering by the company of fifteen new cars for the city system. Negotiations are now pending looking toward the financing of the purchase of the cars.

**Fare Increase Again Suspended.**—The Public Service Commission for the Second District of New York on March 20 suspended to and including May 22, proposed increased fares on the Rochester & Syracuse Railroad which are under investigation by the commission. The new fare rates were filed on Oct. 25 and they have been under suspension. The increased fares were due to establishing two 5-cent fare charges in Rochester, instead of one, and increasing all other fares on the line by 5 cents.

**New Jitney Measure in Kansas City.**—The City Council of Kansas City, Mo., has passed a jitney ordinance which regulates the fare to be charged—10 cents for the first twenty blocks and 5 cents for each additional twenty blocks. Yearly license is set at \$12.50. No jitney will be allowed to solicit business or remain stationary on any of the distinctly business streets. The police will designate such corners in this district at which they may stop to take on and discharge passengers. An operator must be experienced before a license will be granted him. The jitney owners were in accord with the spirit of the measure.

**Report of Arnold Company on Louisville.**—The Louisville (Ky.) Railway expects to receive a report from the Arnold Company, Chicago, Ill., who recently made a survey of the railway at Louisville. It is intimated that the report will recommend one-man cars for some small lines and elimination of unnecessary or paralleled lines. A reduction of expenses such as the adoption of these measures would bring about, along with a possible increase to a 6-cent fare, would probably enable the company to about break even on the increases in wages ordered by the War Labor Board.

**Auto and Railway in Fight for Traffic.**—A keen competition has developed between the automobile stages and the lines of the Portland Railway, Light & Power Company, operating between Portland and Vancouver, Wash., in an effort to obtain patronage. The auto fare has been reduced from 35 cents and 50 cents to 25 cents. The railway fare is 15 cents, but about fifteen minutes longer time is required to make the trip by railway than by auto. During the mobilization of soldiers at Vancouver Barracks, sixty-two auto stages operated between the two cities. This number has gradually been reduced to forty.

**Yonkers Agrees to Increase.**—The Board of Aldermen of Yonkers, N. Y., by a vote of six to four decided on March 22 to allow the Yonkers Railroad, operating practically all the surface lines in the city, to charge an extra 5-cent fare everywhere beyond the city limits. The new rate is to become operative ten days after the signing of the formal agreement by the railroad company. The lines affected are those running to the Van Cortlandt Park terminal of the New York subway, to the Third Avenue Elevated terminal at 198th Street and to Mount Vernon, Hastings-on-the-Hudson, Tuckahoe and Jerome Avenue surface lines in the Bronx.

**Recent Pennsylvania Increases.**—The Williamsport (Pa.) Passenger Railway has filed notice with the Public Service Commission of Pennsylvania abolishing all tickets and placing the lines on a 5-cent basis, as well as changing the transfer plan. Notice of increase in commodity rates was filed by the Chambersburg, Green Castle & Waynesboro Street Railway; advance to 6-cent fares by the Shamokin & Edgewood Electric Railway; advance from 6 to 7 cents by the Ephrata & Lebanon Traction Company, which also raised fares in its two terminal towns to 7 cents from 5 and discontinued the sale of strip tickets in those places.

**Fare Increase Refused.**—In an order promulgated on March 17 the Railroad Commission of South Carolina refused the request of the Charleston-Isle of Palms Traction Company for increased rates and turned its file over to the attorney general to bring action against the corporation to compel it to put in the 3-cent rate per mile, with a minimum charge of 5 cents, ordered by the commission Oct. 2, 1918. On March 12 James Sottile, president of the company, appeared before the commission and stated that the 3-cent rate was not enough to permit the corporation to pay operating expenses and that if the company was forced to adhere to such a rate the road would have to discontinue operations.

**Penn Yan Line Reduces Fare.**—The Penn Yan & Lake Shore Railway, Penn Yan, N. Y., on March 19 filed with the Public Service Commission for the Second District of New York a new schedule of rates proposed as effective on April 1 by special permission of the commission. The one-way fare between any two points within the same fare zone except within an incorporated village or city, will be reduced from 7 cents to 6 cents and twenty strip tickets will be sold for \$1, a reduction, and monthly school commutation ticket books, good for travel between points in two or more zones, reduced from 3.5 to 3 cents per coupon. Baggage and parcel rates and charges for transporting trunks and bicycles will be reduced.

**Fare Tokens in St. Louis.**—Metal tokens will replace paper car tickets on the lines of the United Railways, St. Louis, Mo., on April 1. A million of the disks will be on hand when the sale begins. The rate of fare is not stamped



on the tokens and therefore they will be good if the fare is changed. They were ordered last year but their delivery was delayed because it was necessary first to change the mechanism on all the fare boxes. The readjusted fare boxes have three cyclometers, one registering small coins, another registering the small metal token, and a third to register a larger metal ticket if the use of one is adopted, as, for instance, to count the children's tickets. The fare disks will be sold by the conductors.

**Fare Increase Considered Unreasonable.**—The Public Service Commission for the Second District of New York on March 20 directed the Warren & Jamestown Street Railway to amend its passenger tariff by providing for round-trip tickets between Jamestown and Hillside at 12 cents each and commutation books, forty single-trip tickets, good between Stillwater, Boniwood, Sumner Street and Hillside and Jamestown will be at \$2.80 per book. These tickets are to be good for sixty days only for New York State interstate travel. The commission's order was upon a complaint that fares between Jamestown and the near-by points had been increased from 5 to 10 cents and that the increase which had been made was unreasonable.

**Seven Cents for Port Jervis.**—Chairman Hill of the Public Service Commission for the Second District of New York on March 21 announced that he would recommend to the commission authority to increase the fare on the Port Jervis Traction Company in Port Jervis and the town of Deer Park from 5 cents to 7 cents, to remain in effect until Jan. 1, 1920. There was no opposition to the company's petition at the hearing and it was stated by J. D. Knox, general attorney for the company, that the Port Jervis and Deer Park authorities had consented to the increased fare. Mr. Knox said the road was run down and there had been an agreement that the revenues over running expenses and taxes should be applied to new equipment and otherwise bettering the service in Port Jervis.

**Wants Six Cents in Evansville.**—The Public Utilities Company, Evansville, Ind., has notified the Mayor of that city through a letter from B. C. Cobb, New York, N. Y., president of the company, that unless the railway is permitted to increase fares from 5 cents to 6 cents it will be necessary to place one-man cars in operation in Evansville. In his letter to the Mayor, Mr. Cobb states that between 400 and 500 cities in the United States now have 6-cent fares and some 7 and 8 cent fares. It also stated that the Evansville Company was operated last year without profit. Mayor Bosse has submitted the matter to the City Council and stated that it would be taken under consideration, as the Public Utilities Company, Evansville, had never asked anything of the Public Service Commission of Indiana without first securing the indorsement of the city administration.

**Six Cents in Sheboygan.**—The Railroad Commission of Wisconsin on March

11 rendered a decision on the application of the Eastern Wisconsin Electric Company to increase the railway fare at Sheboygan to 6 cents. The application of the company requested authority to increase the present 5-cent fare to 6 cents for all passengers more than five years of age. The decision of the commission authorizes an increase to 6 cents for all passengers more than seven years of age, with six tickets for 35 cents, and a fare of 3 cents for children from five to seven years of age, inclusive, with twelve tickets for 35 cents. The increases went into effect on March 23. The company ran a series of talks in the newspapers explaining the necessity for the 6-cent fare and giving to the public much general information regarding the railway situation throughout the country.

**One-Man Cars Reduce Accidents.**—Fewer accidents on one-man cars than on the regular cars is the experience of the Dallas (Tex.) Railway, according to Richard Meriwether, vice-president and general manager, who made public statistics covering the eight months period during which one-man cars have been in operation in Dallas. Three accidents for every 2000 miles is the average established by the one-man cars operated on the San Jacinto-Akard Street line, during the period from July 1, 1918, to March 1, 1919. During this eight-month period the twelve one-man cars on this line traveled 268,064 miles and reported 176 accidents, an average of 1½ accidents per 1000 miles. During the same period other types of cars operated in Dallas covered 4,544,123 miles and reported 2357 accidents, an average of 1.92 per 1000 miles. It was also found that the one-man cars maintain a much faster schedule than other type of cars in Dallas.

**Receiver Opposed to State Court Interference.**—Exception to the jurisdiction of the State courts to control him in any manner has been interposed by J. D. O'Keefe, federal receiver of the New Orleans Railway & Light Company, New Orleans, La., by means of a motion filed through counsel in the State Supreme Court. The motion was offered in the suit of Wilbert Black and others to enjoin the company and the city of New Orleans from collecting a 6-cent fare. Receiver O'Keefe took the position that he is appointed by and as an officer by the United States District Court and is subject to the authority of only that tribunal. The attorneys for Black and the other plaintiffs were ordered by the Supreme Court to show cause recently why Mr. O'Keefe's contentions should not be upheld. The motion filed by the receiver was the result of an order issued by the Supreme Court on Jan. 18, directing him to appear within twenty-five days as a party defendant in the injunction proceedings. That order had been issued on the supplemental petition of Wilbert Black and his co-plaintiffs, praying the Supreme Court to make the federal receiver a party defendant to their suit.

## New Publications

### 1919 Income Tax Procedure

By Robert H. Montgomery. The Ronald Press Company, 20 Vesey Street, New York, N. Y. 980 pages. Leather, \$6.

This book, written by a man of unassailable authority on the subject, is a compendium of invaluable instructions and comments in regard to income tax procedure. The author not only quotes the sections of the revenue law and rulings of the Treasury Department in regard thereto, but also analyzes the points involved and indicates simply and clearly the proper course of procedure. It is not too much to say that for those corporations and individuals conversant with Mr. Montgomery's book the difficulties of making correct income tax returns are reduced to a minimum. A supplement is to be issued to take care of late regulations, this being necessitated by the slowness of Congress in passing the law.

### Training for the Electric Railway Business

Written under the supervision of T. E. Mitten, chairman of the executive committee of the Philadelphia (Pa.) Rapid Transit Company, by C. B. Fairchild, Jr., executive assistant of the company. Philadelphia and London, J. B. Lippincott Company, 155 pages. Price, \$1.50.

This is one of a series of books issued by the publishers, descriptive of the needs, channels of advancement, and advantages and disadvantages of different pursuits, and it will give a young man who is about to choose an industry a good idea of the demands and requirements made by the electric railway industry.

It sketches the duties and necessary qualifications of the electric railway executive, transportation man, engineer, accountant, and workers in other branches of the industry. Mental poise, loyalty, cheerfulness, candor, tact, study, experience, gumption, and ability for hard work are all needed, Mr. Fairchild thinks, in this business, with the ability of meeting men in all walks of life, of differentiating between true and false economy and the possession of that idealism which enables a man to invent and develop new and better devices, improved processes and better ways of doing things. The book is an excellent treatise for the young man and also for the industry because it should attract the right kind of recruits.

Although written primarily for the young man looking forward, the book is an excellent treatise for those already engaged in the industry. Many a railway officer will get better and clearer ideas of what he should do and how he should do it by reading Mr. Fairchild's description of the duties of his position.



## Personal Mention

### Mr. Dozier Elected

Manager of Nahant & Lynn Street Railway Made President of New England Street Railway Club

Joseph E. Dozier, who was elected president of the New England Street Railway Club at the annual meeting on March 27, is well known in electric railway circles in the East, although he entered the traction field only fourteen years ago. He was born in Barnesville, Ga., in 1867, and was reared in Macon, Ga., graduating from Planters' Academy in 1886. In his boyhood he was employed as night operator by the Southern Bell Telephone & Telegraph Company for five years. This experience led to his appointment as an exchange manager soon after leaving school. He remained with the Southern Bell Company until 1894, when he was called



J. E. DOZIER

to Boston by the New England Telephone & Telegraph Company. He served as manager of various exchanges until 1905 when he resigned to become associated with the Nahant & Lynn Street Railway, which he constructed and has operated ever since. Mr. Dozier has been much interested in public affairs in the Lynn district and has an unusually wide circle of friends outside as well as in the electric railway field who have been won by his genial personality and straightforward business methods.

### Journal Appoints Cleveland Representative

This paper has appointed David Cameron to take charge of its advertising business in Ohio, eastern Indiana and eastern Michigan. His headquarters will be in the Leader-News Building, Cleveland.

Mr. Cameron has been connected with the New York office of this paper for the last five years except for about a

year and a half during the war when he served as a lieutenant in the aviation division of the Army. He is a native of Pennsylvania and was graduated from the arts department of Dickinson College in 1914. The office in Cleveland was opened because of the growing importance of the district as an industrial and railway center.

Thomas Roycraft, who has been general manager of the Grand Forks (N. D.) Street Railway, for the last seven years, has resigned to return to private life. W. L. Hawkes, superintendent of the company, is now intrusted with the duties of general manager.

James R. Sheffield, who has been appointed receiver of the Interborough Consolidated Corporation, New York, N. Y., which controls the Interborough Rapid Transit Company and the New York Railways, is a lawyer and was a former Assemblyman of New York. He served two years as head of the fire department and was for a time president of the Republican Club.

F. B. Clements has been appointed secretary and auditor of the Mobile Light & Railroad Company, Mobile, Ala., succeeding M. W. Glover whose appointment as auditor of the West Penn Railways, Pittsburgh, Pa., is mentioned elsewhere in this issue. Mr. Clements, was connected with the Panama Railroad on the Isthmus of Panama for several years.

W. H. Cameron has resigned as general manager of the National Safety Council to become manager of industrial relations for the Eastman Kodak Company, Rochester, N. Y. In accepting the resignation the executive committee passed a resolution containing the statement that "the success of the National Safety Council is largely due to the splendid service Mr. Cameron has given, and his personal contribution to the safety movement has been of inestimable value to the cause."

C. W. Price has been elected general manager of the National Safety Council, succeeding W. H. Cameron. Mr. Price spent twelve years with the International Harvester Company, during the last four of which he was in charge of safety work for all of the plants. For five years he was assistant to the Wisconsin Industrial Commission, working upon standards of safety and sanitation, and conducting educational safety campaigns in the large industrial centers. In 1917 he acted as director of the safety survey made by the United States Employment Compensation Commission of all arsenals and navy yards. For two and a half years he has been field secretary of the National Safety Council.

M. W. Glover has resigned as secretary and auditor of the Mobile Light & Railroad Company, Mobile, Ala., to accept the position of auditor of the West Penn Railways, succeeding in that position John Young, resigned. Mr. Glover entered upon his new duties on March 15, and his headquarters will be at Pittsburgh, Pa. The new auditor of the West Penn Railways has had an extended experience in railroad accounting. He began railroad work at Charleston, S. C., in the local freight office of the South Carolina Railroad, then in the hands of a receiver. He was transferred later to the auditor's office and there handled freight and passenger as well as other accounts. The property was purchased by the South Carolina & Georgia Railroad, of which Mr. Glover was appointed traveling auditor. Later the road was absorbed by the Southern Railway, and he remained as traveling auditor with that company, being advanced to the position of chief traveling auditor of the Southern Railway. He gave up this work in June, 1903, to take up that of chief clerk to the auditor of the Atlanta & West Point Railroad and the Western Rail-



M. W. GLOVER

way of Alabama. Mr. Glover became connected with electric railway accounting in July, 1906, when he accepted the position of auditor of the lines now comprising the Ohio Electric Railway, Cincinnati, Ohio. In January, 1910, he was appointed secretary and auditor of the Mobile Light & Railroad Company, Mobile, Ala. Mr. Glover has always taken an active interest in association affairs. He was prominent in the formation of the Central Electric Accounting Conference and was its president from 1907 to 1909. In 1912 he was elected first vice-president and in 1913 was elected president of the American Electric Railway Accountants' Association, presiding at the annual conventions of the association in 1913 and 1914.

A. B. Coryell has accepted the position of power superintendent of the Port Huron Gas & Electric Company, Port Huron, Mich. Mr. Coryell was formerly in business for himself in Buffalo, N. Y. He has been engaged in the electric railway and light work for



more than twenty-five years. During this time he has had charge of the construction and management of properties in different parts of the country, mainly in the Southern states. He was however, for four years superintendent and purchasing agent of the Moncton Tramways, Electricity & Gas Company, Moncton, N. B.

Mrs. C. L. Stevens, for years chief clerk to T. G. Brabston, transportation manager for the Birmingham Railway, Light & Power Company, Birmingham, Ala., has been appointed assistant traffic manager, and will be in virtual charge of all freight operations of the company. Mrs. Stevens for ten years was chief clerk to Mr. Brabston. He was made transportation manager on Jan. 1, 1919, and since that time his duties have been piling up. Mrs. Stevens was appointed to relieve him of a portion of his work.

C. E. Calder, Dallas, Tex., has been elected vice-president of the four properties owned by J. F. Strickland—the Texas Electric Railway, the Dallas Railway, the Dallas Power & Light Company and the Texas Power & Light Company. For some years Mr. Calder was secretary-treasurer of the Eastern Pennsylvania Railways and the Eastern Pennsylvania Light, Heat & Power Company, Pottsville, Pa. Mr. Strickland first employed Mr. Calder as secretary and assistant treasurer of the Texas Power & Light Company. When Mr. Strickland took over the Dallas street railway properties, Mr. Calder was placed in charge of the financial matters in connection with the transfer. This work he has performed to the satisfaction of all, and now he is made vice-president of all the Strickland properties.

Job E. Hedges, who has been appointed receiver of the New York (N. Y.) Railways, was born at Elizabeth, N. J., on May 10, 1862. He was graduated from Princeton with the degree of A. B. in 1884 and received an A. M. from the same institution in 1887 and an LL. B. from Columbia Law School in 1886. He had the degrees of L. L. D. conferred upon him by St. Lawrence and the University of Pittsburgh in 1914. He was admitted to the bar in 1886 and has since practiced law in New York. He was secretary to Mayor Strong in 1895-97, city magistrate in 1897-98, and Deputy Attorney-General of New York in 1902. He was a commissioner for the United States on the International Fisheries Commission. He was one time Republican candidate for Governor of New York State, but was defeated.

J. Willison Smith has been appointed manager of the Division of Passenger Transportation and Housing, United States Shipping Board, Emergency Fleet Corporation, to succeed A. Merritt Taylor, resigned. Mr. Smith entered the employ of the Land Title & Trust Company, Philadelphia, Pa., in April, 1895, as a clerk. He worked his way through the various departments of the company and finally in July, 1917, in recognition of his ability and

his faithful service to the company he was elected a director and one of the vice-presidents. When Charles M. Schwab took charge of the Emergency Fleet Corporation Mr. Smith obtained an indefinite leave of absence from the Land Title & Trust Company and was made assistant director of housing and transportation of the fleet corporation.

Frank T. Hamilton, who has assumed the position of president of the Omaha & Council Bluffs Street Railway, Omaha, Neb., is a native of Omaha. His father, the late C. W. Hamilton, was one of the substantial pioneer businessmen of the city. The elder Hamilton was identified with the early banking house of Caldwell, Hamilton & Company, and he was the first president of the United States Bank of Omaha. The new president of Omaha's extensive traction system was reared in an atmosphere of business. He has grown with growing Omaha, and has observed Nebraska's metropolis develop from a Western town to its present population of more than 200,000. He entered the Merchants' National Bank, Omaha, thirty-two years ago as a clerk and he is now



F. T. HAMILTON

first vice-president of that institution. His election as a director of the Omaha & Council Bluffs Street Railway occurred fourteen years ago. He was elected vice-president of the company twelve years ago. His recent election to the presidency of the company came as a logical succession to G. W. Wattles, who guided the company through a period of extension and reorganization. Mr. Hamilton is also serving as president of the Omaha Gas Company, a position which he has held for fourteen years, succeeding his uncle, the late Frank Murphy. President Hamilton's intimate knowledge of the growth, business history, and general conditions of Omaha peculiarly fit him for the presidency of this large public service utility. He has an extensive acquaintance among business men of the West and it is the general opinion that his administration of the affairs of the electric railway will be approved by the public as well as by his board of directors.

## Obituary

George W. Wilson, secretary, treasurer and a director of the International Railway, Buffalo, N. Y., died on March 18. Mr. Wilson was born in Buffalo fifty-one years ago. He had been associated with the International Railway for six years. Death was due to heart trouble. Mr. Wilson had been sick for almost eight weeks. He is survived by his widow, Mrs. Helen Wilson, and a daughter, Mrs. Clifford W. McIntyre.

Walter F. W. Dow, roadmaster of the Southern division surface lines of the Brooklyn (N. Y.) Rapid Transit System, died on March 14, as the result of pluro-pneumonia. Mr. Dow was forty-nine years old. He had been connected with the company for more than thirty years, having commenced his training for track work under his father, the late Nelson Dow, one-time roadmaster of the old Brooklyn City Railroad. He had thus been identified with surface transit improvement since the early horse-car days, and much of the modern track in Brooklyn was installed under his supervision. Mr. Dow was of a genial, retiring disposition and accomplished his work in an unobtrusive but effective manner. He is survived by his widow and two daughters.

## Thrift Put Into Practice

The Kansas City (Mo.) Railways in addition to conducting a building and loan association for its employees; insuring their lives and retiring them on a pension large enough to support them, is also conducting a savings bank for its employees.

Other savings banks pay depositors only 3 per cent and usually compound it every six months. The railway's bank pays 6 per cent and compounds monthly. Money mounts up rapidly in this manner. One man who began with an account of \$1 a month two years ago now has \$200 in the bank drawing interest at double what he could get in any savings bank. Another man who began on Aug. 6, 1917, with \$50 a month now has \$1,502 to his credit.

The company realizes that its own prosperity depends largely upon the prosperity of its employees and it is striving in every manner possible to improve the financial condition of its laborers. If a man shows himself desirous of saving, of accumulating money, securing a home—it helps him. There is a good illustration of one man—a foreigner—who entered the company's employ eight years ago, with \$2 as the sum of his earthly possessions. He took advantage of every offer the company made him for bettering his condition. He now owns a home in the suburbs and has enough money deposited in the company's savings bank to pay him a substantial monthly interest.



# Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER,

SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES

BUSINESS ANNOUNCEMENTS

## New Steel Prices Already Stimulate Market

Reductions Not as Great as Expected—  
Rails Off \$10—All Railway Prices  
Not Yet Available

Prior to the meeting on March 20 between the steel producers and the Industrial Board, at which new prices were agreed upon for iron and steel products, a great many producers had expressed an opinion that at this time either a large reduction in prices should be made, which would interest the long-range buyer, or no reduction at all. The result of this meeting shows that a middle course has been taken. The Industrial Board announced that the public should not expect to buy below the reduced prices throughout the present year.

The ruling boils down to about the following reductions: \$5 per net ton for wire products and grooved steel skelp and \$7 per net ton for everything else. Some manufacturers of steel and iron products affected feel that this is not sufficient reduction to stimulate very much demand for large stocks. It will, however, open the market for many propositions which have just been holding off for such a cut in price.

Since the prices went into effect, considered as the morning of March 21, it is evident that trading in the iron and steel market has been stimulated by the price readjustments. Orders reaching the mills bear earmarks of having been practically made up before the price announcement, and held over for the expected drop.

Inquiries have resulted in locating some of the new prices which hold for electric railway equipment. Several producers have stated that they are now working on their new figures and that they will be completed the first of April. This is rather true of that class of equipment where labor costs enter to a large extent.

Standard Bessemer rails per gross ton have dropped from \$55 to \$45 while open hearth rails have dropped from \$57 to \$47 per gross ton. Light rails have been set at 2.35 cents per pound. A report has been received that spikes, tie plates, and fish plates have not changed. Steel bars have come from 2.70 cents per pound to 2.35 cents, while iron bars have come from 2.90 cents a pound to 2.35 cents, placing both iron and steel bars on the same level. Iron for castings for electrical machinery has been reported off from 1 to 1½ cents per pound. Sheets from which tubular steel poles are made have been reduced about ½ cent per pound.

Wire rods per gross ton have dropped

from \$57 to \$52, plain wire per cwt. from \$3.25 to \$3.00 and nails from \$3.50 to \$3.25 per cwt. One prominent wire products concern has reduced its products approximately \$5 per ton, while another concern has not yet stated how much its products have been reduced, as they are from high priced stock.

Reductions in tubing are uniformly \$7 per ton. Rigid iron conduit has come down 5 points and flexible metallic conductor \$10 per 1000 ft. The basing discount on steel boiler tubes, 3½ to 13 inch, is 3½ per cent for less than car load lots.

Pole line hardware is easier by 5 per cent. Basic pig iron per gross ton, which previously had dropped from \$33 to \$30, has come down to \$25.75. Black sheets, No. 28 gage, have decreased from \$4.70 to \$4.35 per cwt., while galvanized sheets of the same gage have decreased from \$6.05 to \$5.70 per cwt.

## Westinghouse Air Brake Report

Unfilled Orders on Hand on Jan. 1 of  
This Year Amounted to \$17,000,000

The annual report of the Westinghouse Air Brake Company and its subsidiaries, including twelve months of operations of the Union Switch & Signal Company, owing to a change in the fiscal period covers seventeen months of operation. Net profits aggregated \$7,461,900.41.

Allowing for anticipated cancellation, the value of unfilled orders of the four constituent companies on Jan. 1, 1919, was approximately \$17,000,000.

## Engineering Advertisers' Association Formed

Advertising and sales managers representing manufacturers in various engineering lines in and around Chicago met in that city on March 11 and organized the Engineering Advertisers Association. The officers elected were: President, H. L. Delander, Crane Company; vice-president, H. Colin Campbell, Portland Cement Association; secretary, G. H. Eddy, Green Engineering Company; treasurer, Edward J. Pratt, Kellogg Switchboard & Supply Co. The board of directors includes: G. S. Hamilton, American Steam Conveyor Corporation; J. J. Arnsfield, Fairbanks, Morse & Company; A. P. Hauck, Allis-Chalmers Manufacturing Company; H. W. Clarke, Chicago Pneumatic Tool Company; P. A. Powers, Benjamin Electric Manufacturing Company, and J. C. Kinsley, A. M. Davis Regulator Company.

## Paints Still Holding on High Levels

Easy-Flowing Paints and Special Mixtures Requiring Few Coats, However, Help to Keep Down Cost

While the cost of paints, varnishes and enamels is still holding a rather high level, due to the cost of the pigments, white lead, zinc, linseed oil, turpentine, varnish gums and other materials, there are several items entering into the cost of the finished job that tend to keep down the total cost. These are being adopted more and more as their results are noted.

Linseed oil, the vehicle in all paints, is rather high in price due to the smaller production of flaxseed. This one material plays a considerable part in the cost of paints, but it is in the correct proportioning of this oil to the character of the work to be done that determines the final result. Some traction companies in the past have made up their own formulas for the paints they thought would serve their purpose best and have found that they did not work to the best advantage. Now the practice of co-operating more closely with the paint manufacturer is becoming more general.

About 80 per cent of the cost of a painting job is labor, so that higher material costs add little to the total cost. This labor item is very noticeable in the flowing qualities of the paint, in the correct proportioning and grade of oil used. Too little oil permits the color to be brushed off after a short time.

The use of enamels is becoming more prominent, giving a very satisfactory finish.

Special paints are now employed which give a completed job from priming coat to protecting varnish in three coats, where heretofore up to fifteen coats have been employed to give this same finish. Baking processes are also used to give the hard finish desired in some cases. One rapid transit company, through the method of painting employed, by permitting cars to get back on the tracks again quickly saves 2 per cent in the rolling stock which was necessary when former methods of painting were used.

It is interesting to note the price paid for cars in England. The *Electric Railway and Tramway Journal* states that the Sheffield (England) Corporation Tramway has ordered fifty double-decked top-covered vestibule tramcar bodies and trucks for the sum of £102,500 (approximately \$512,500 or \$10,250 each) with 5 per cent for contingency.



## Copper Wire at Low Level

Current Conditions Warrant Belief that Copper Will Go Higher and That Wire Will Follow

Copper prices are stiffening a little under somewhat heavier buying. While it is probably true that selling interests are simply feeling out the market there seem to be good reasons for believing that the low point of 14½ cents which was reached a short time ago will hold as a low mark for some time. Copper production costs are high and as a consequence producers will advance the market as long as buyers will stand for it. Current copper prices are but a cent or so higher than normal quotations. It would not be surprising therefore to find copper around 18 cents by the summer months.

Copper wire followed the metal down very closely. When copper was 26 cents rubber covered wire base was 34 cents, when copper was 14½ cents, rubber covered base was 20 cents. Now that copper is up three-quarters of a cent it would not be surprising to see a higher wire base the first part of the week.

It seems reasonable, in other words, to believe that copper wire and cable has reached its low price level and that from now on higher prices might be expected, provided always, of course, that copper advances.

## Government to Dispose of Rails

According to advices received by the ELECTRIC RAILWAY JOURNAL from the office of the chief of engineers of the War Department, Washington, D. C., the government plans to sell at prevailing prices the surplus stock of 80-lb. and 25-lb. rails ordered for the American Expeditionary Force overseas, but not required due to the signing of the armistice.

There are about 50,000 tons of 80-lb. rail and about 7000 tons of 25-lb. rail. Also there are large quantities of crossings, slip switches and turnouts. The bulk of this material is at ports readily accessible for loading. All sales are being conducted through the office of the Director-General of Military Railways, Washington, D. C.

## Board Formed to Assist Industry

President Wilson has authorized an Industrial Board of the Department of Commerce to call industry together group by group, and let them decide on prices to be offered to the nation as the governmentally approved judgment of assembled industry on a price scale low enough to be stable, homogeneous throughout the whole fabric, and founded so solidly on a comprehensive review of conditions as to encourage general buying, including that of the railroads and other governmental agencies, and the general resumption of normal activities.

The offices of the board will be in the Council of National Defense Building, 18 and D Streets, Washington, with

George N. Peek as chairman. No control is authorized by this board, the object being solely to secure co-operation.

## New Member of U. G. I.

The New Organization Will Assume Charge of Residual Sales, Engineering and Construction

The officials of the United Gas Improvement Company believe that the future holds promise of increased demand for gas and electricity and for additional plant equipment. With this in mind they have formed a new company, which they have called the U. G. I. Contracting Company. Paul Thompson, one of the U. G. I. vice-presidents, is president of the new contracting company. In a recent interview he said:

"This new organization will not only engage in engineering and construction problems, but it will include an up-to-date selling organization to take entire charge of the sale of by-products. We shall also engage in the construction and sale of water-gas apparatus, vertical retorts, waste heat boilers, and auxiliaries of various kinds. We expect also to design and erect power plants, and will have a special road division competent to construct and maintain roads and highways under contract. We shall also make paints, and it is probable that later on we shall seek contracts for industrial painting."

The other officers of the U. G. I. Contracting Company are J. P. A. Criafield, and D. J. Collins, vice-president. The offices of the company will be for the present in the U. G. I. Building, Philadelphia.

## Rolling Stock

Jackson Railway & Light Company, Jackson, Tenn., has purchased three Birney cars from the American Car Company.

St. Thomas (Ont.) Street Railway plans to renovate seven old cars into one-man pay-as-you-enter cars at a cost of \$7,000, and to use \$3,000 for new equipment. St. Thomas ratepayers are to be asked to vote on a by-law for the issue of debentures for \$50,000.

Chattanooga Railway & Lighting Company, Chattanooga, Tenn., lost its power house supplying the Incline Railway on Lookout Mountain by fire on March 23, together with considerable machinery, sheds and several cars. One of these cars, speeding to the bottom, burned considerable part of the trestle work.

Gadsden, Bellevue & Lookout Mountain Railway, Gadsden, Ala., expects to purchase as soon as possible two ten-bench open cars with double-end control and one closed car, not more than 29 ft. over all. Prices are desired on second-hand cars, with Southern prices preferred on account of freight rates. The ELECTRIC RAILWAY JOURNAL of Jan. 4 gave reference to this rolling stock.

Decatur Railway & Light Company, Decatur, Ill., announces that it will at once place orders for eight modern pay-as-you-enter cars of the most improved type. The cars will seat thirty-two passengers, will have but one door for both entrance and exit and will be light in weight and construction, replacing the heavy cars which are now in use by the company. H. E. Chubbuck, vice-president executive of the Illinois Traction System, has announced that in all fifty of these cars will be purchased, the order for eight cars for the Decatur Railway & Light Company being only a part of the total purchase. Prior notice of new rolling stock was given in these columns on Feb. 15.

## Track and Roadway

Pacific Electric Railway, Los Angeles, Cal.—Work has been begun by the Pacific Electric Railway improving its line through Sawtelle. New rails are being laid and the roadbed rebalasted and paved the entire distance through Sawtelle. The cost is estimated at \$90,000.

Public Service Railway, Newark, N. J.—The engineering department of the Public Service Railway has completed plans, which have been approved by the government, for the extension of the French Street line to the federal housing site on the Franklin Park Road. The entire project will be financed by the federal government and it is estimated that it will cost approximately \$75,000. When the extension is completed it will be the property of the United States government, but under a mutual agreement between the Public Service Railway and the officials of the United States Housing Bureau, the Public Service Railway will be given a franchise to operate its cars on the extension.

Fayetteville, N. C.—It is reported that Herbert L. Jones, Richmond, Va., will construct an electric line along the principal streets of Fayetteville to the Cape Fear River and also to Camp Bragg.

Sapulpa, Okla.—A movement has been begun by citizens of Sapulpa to secure the construction of a line from Drumright to Shamrock, Okla., about 6 miles. The Board of Trade may be able to give further information.

Fort William (Ont.) Electric Railway.—It is reported that the public utilities committee of Fort William is considering an extension of the Fort William Electric Railway to Mission Park, at an estimated cost of \$68,235.

Grand River Railway, Galt, Ont.—The Grand River Railway reports that it has under construction a 2-mile diversion of its Hespeler branch between Preston and Hespeler, for the purpose of getting on higher ground away from the river, and the consequent damage as a result of spring freshets, as well as to provide a straight line with a view to increasing the service.



**Philadelphia, Pa.**—Sealed proposals will be received until April 15, 1919, by William S. Twining, Director of Department of City Transit for the construction of the first four sections of the Frankford, Bustleton and Byberry Surface Passenger Railway from Frankford to Bustleton, about 6 miles. The contract will include the grading and the furnishing and laying of the track and the construction of a 504-ft. steel viaduct. Plans and specifications may be obtained upon deposit of \$10, which will be refunded upon the return of the plans.

**Montreal (Que.) Tramways.**—The Montreal Tramways will extend its lines into the towns of Ville St. Michel and of Ville Montreal-Nord.

### Power Houses, Shops and Buildings

**Gadsden, Bellevue & Lookout Mountain Railway, Gadsden, Ala.**—This company reports that it will build a new carhouse, 40 ft. x 100 ft., in June.

**Eureka Traction Company, Eureka Springs, Ark.**—A report from the Eureka Traction Company states that it expects to place contracts during the next three weeks for the construction of a new carhouse. The company also plans to enlarge its amusement park.

**Helena Gas & Electric Company, Helena, Ark.**—Plans are being considered by the Helena Gas & Electric Company for the construction of a new gas plant to provide for increased capacity.

**Pensacola (Fla.) Electric Company.**—It is reported that the Pensacola Electric Company will purchase additional equipment and make improvements to its plant.

**Bangor Railway & Electric Company, Bangor, Me.**—The Bangor Railway & Electric Company plans to install three water wheels of 250 hp. capacity each in its Veazie plant during the coming year.

**Hagerstown & Frederick Railway, Hagerstown, Md.**—Plans are being prepared by the Hagerstown & Frederick Railway for the construction of a substation, carhouse and freight station, 40 ft. x 60 ft., one story, to cost \$10,000.

**St. Joseph Railway, Light, Heat & Power Company, St. Joseph, Mo.**—About \$1,000,000 will be spent by the St. Joseph Railway, Light, Heat & Power Company for improvements to its plant. All obsolete machinery will be replaced with new and modern apparatus and the capacity of the plant will be so enlarged as to remove all possibility of a recurrence of a breakdown such as occurred last winter. Additional pumps will be placed in service so that the company will not be forced to depend upon the city water plant for water.

**Pacific Power & Light Company, Astoria, Ore.**—It is reported that the Pacific Power & Light Company plans the early installation of an additional unit in its power station at Astoria.

### Trade Notes

Robert L. Hubler has been appointed general sales manager of the Ohmer Fare Register Company, Dayton, Ohio.

C. E. Hague, formerly production engineer of the Mid-West Engine Company, Indianapolis, Ind., has been appointed sales manager of the American Steam Conveyor Corporation, Chicago.

W. A. Jones Foundry & Machine Company, Chicago, Ill., manufacturer of power transmission apparatus, special foundry and machine work, and also the Jones spur gear speed reducer, has opened an Eastern office at 30 Church Street New York City, under the direction of Lemuel C. Biglow, formerly with the Morse Chain Company of Ithaca, N. Y.

Duntley-Dayton Company, it is understood, has taken over the entire output of the Dayton Pneumatic Tool Company. The Duntley-Dayton Company, which is located in the Westminster Building, Chicago, is also putting out a complete line of portable electric drills and grinders. W. O. Duntley, former president of the Chicago Pneumatic Tool Company, is president of the new company, and his son, C. A. Duntley, is vice-president.

Powdered Coal Engineering & Equipment Company, Chicago, Ill., announces that Willis B. Clemmitt and George H. Ruppert have become associated with the company as advisory engineers. Mr. Clemmitt was formerly associated with the Central Iron & Steel Company at Harrisburg, Pa., and Mr. Ruppert before his entry into the chemical warfare branch of the service, had charge of sodium-ferro-cyanide department of the Semet-Solvay Company.

United States Electric Signal Company, West Newton, Mass., announces recent orders taken as follows: During the month of February, shipment was made to the Tampa (Fla.) Electric Company of six Collins type A motor-operated track switches, and on March 20 to the same company seventeen type K 2 block signals, three type K 3 run-over signals and forty-one type 5 A trolley switches for use in operating the signals. On March 29 shipment is expected of four more type K 2 signals and eight type 5 A trolley switches.

International Register Company, Chicago, Ill., has recently received from the Boston Elevated Railways an order for 275 motor-driven coin registers to take money and metal tokens. These registers will be installed on the new surface cars ordered by the Boston Elevated Railway. The machines to be used are similar to the coin registers previously supplied to the railway by the same manufacturer but have an additional totalizer for registering metal tokens.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., through its Canadian company, has received from the Hydro Electric Power Commission of Ontario an order for

two 45,000-kva. vertical water-wheel generators of 12,000 volts, three phase, 25 cycles, for the commission's Queens-town development. These are said to be the largest water-wheel generators ever constructed and indicate that the Hydro Commission Development thinks there is no time like the present for construction work.

**Foreign Opportunity.**—A manufacturer in Italy desires to purchase iron, steel, brass, copper, aluminum and lumber used in the construction of railway cars. Correspondence should be in Italian. Refer to No. 28776, Bureau of Foreign and Domestic Commerce, Washington, D. C., for further information.

**British-Australian Machinery Company, Ltd., 50 Broad Street, New York City,** desires contact with manufacturers wishing to enter and develop their trade in the Australian market. The company handles everything in connection with narrow-gage and industrial railways.

### New Advertising Literature

**Indianapolis Switch & Frog Company, Springfield, Ohio:** A folder on "Solid Manganese Track Work."

**Holden & White, Inc., Chicago, Ill.:** A folder entitled "The Use of Slack Adjusters as a War-Time Economy."

**British-Australian Machinery Company, Ltd., 50 Broad Street, New York City:** An illustrated booklet entitled "Trade With Australia."

**Page Steel & Wire Company, New York City:** Booklet entitled "Armco Iron Rods and Wire for Oxy-Acetylene and Electric Welding."

**Quigley Furnace Specialties Company, Inc., New York City:** Bulletin No. 11 on the "Transport System" of the Quigley powdered fuel system.

**Automatic Reclosing Circuit Breaker Company, Columbus, Ohio:** Bulletin No. 301 describing the company's new types of breakers ARL, DRL, and CRL.

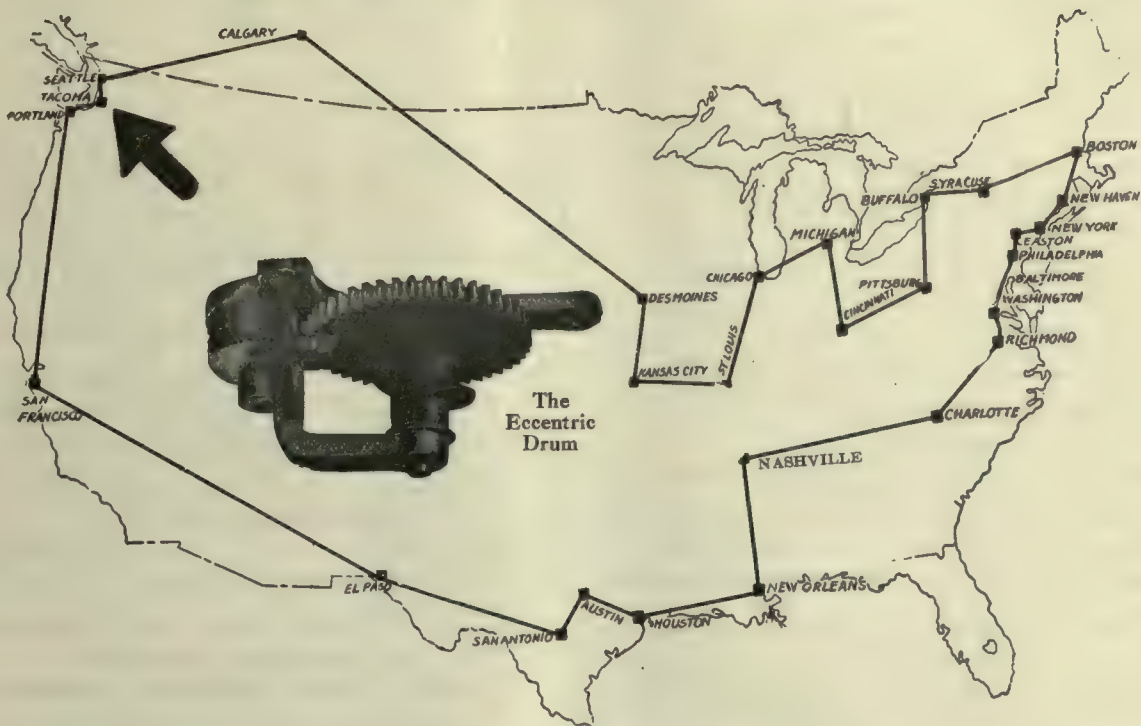
**Air Reduction Sales Company, New York:** Folders showing the benefits derived from the use of air-cooled products, and methods for the purpose of building up worn rail parts and for repairing damaged locomotive cylinders.

**American Roller Bearing Company, Pittsburgh, Pa.:** Bulletin 1004 describing type-C roller bearings. This is a bearing designed for use under conditions of medium loads at medium speeds, such as for auxiliary devices like inspection cars, baggage trucks, work cars and similar equipment.

**Ohio Brass Company, Mansfield, Ohio:** Catalog No. 17—1919. This catalog contains 671 pages and is divided into the following sections: porcelain insulators, pole hardware and miscellaneous, trolley materials, catenary materials, bonds and tools, third-rail insulators, car equipment, tables and indexes. It is well illustrated and has an alphabetical, catalog number and code word index.



# Peacock Brakes from Coast to Coast



## Tacoma Knows What *REAL* Grades Mean—and Uses Peacocks

Tacoma is like Seattle and Portland in that it is emphatically a city of steep hills—on which they use PEACOCK BRAKES.

Is it likely that roads like these would select and continue to hold on to PEACOCK BRAKES unless their reliability was beyond all question?

Braking in hilly Tacoma is always a problem, especially during the long rainy spells. It is then that the PEACOCK ability to stop a car without locking the wheels counts for absolute safety.

Upon request, we are ready to design and proportion PEACOCK BRAKES to meet your individual requirements as regards car weight (empty and loaded) grades, speed, truck design and other factors.

*Next Stop* — SEATTLE

**National Brake Co.**  
Buffalo, N. Y.



# Bankers and Engineers

## Ford, Bacon & Davis, Engineers.

115 BROADWAY

New Orleans

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## THE J. G. WHITE COMPANIES

ENGINEERS  
FINANCIERSCONTRACTORS  
OPERATORS43 EXCHANGE PLACE . . . NEW YORK  
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CONSULTING AND CONSTRUCTING ENGINEERS

Valuations Reports Investigations  
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## ENGELHARDT W. HOLST Engineer

Reports, Appraisals, Reorganizations

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## THE P. EDW. WISH SERVICE, Inc.

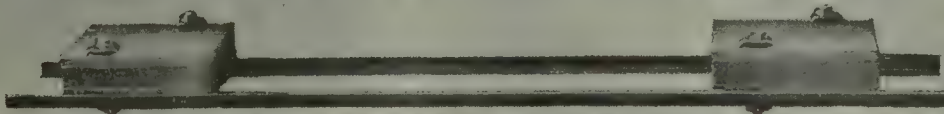
Suite 1710 DETECTIVES Suite 715  
Park Row Bldg., New York Board of Trade Bldg., BostonWhen writing the advertiser for information or  
prices, a mention of the Electric Railway  
Journal would be appreciated.ELECTRICAL TESTING LABORATORIES  
Electrical, Photometrical and  
Mechanical Testing.

80th Street and East End Ave., New York, N. Y.

Scofield Engineering Co. Consulting Engineers  
PHILADELPHIA, PA.  
POWER STATIONS GAS WORKS  
HYDRAULIC DEVELOPMENTS ELECTRIC RAILWAYS



# The MECHANICAL RAILWAY TIE



## Each DAYTON Mechanical Tie

**rests on its own  
resilient cushion**

The rigidity of a concrete roadbed PLUS the shock-absorbing resiliency of asphalt—that is why Dayton Mechanical Ties mean **BETTER** tracks at **LESS** cost.

They reduce not only **track maintenance** cost, but rail repair costs and they eliminate all those attendant evils that follow when wheels pound on rails that have a non-resilient foundation.

The **installation** of Dayton Ties is nearly as simple as concrete paving—and the cost is far below that of untreated wood ties in gravel ballast, labor costs considered.

A half mile on test will show which is best. Get in touch with us today.



Low Cost to Install  
No Cost to  
Maintain



THE DAYTON MECHANICAL TIE CO.

201 Third Street Arcade  
DAYTON, OHIO





## Metal Fare Tokens



Enlarged to  $1\frac{1}{2}$  times actual size

Nickel-Silver  
Bronze or Brass

Designs developed according to your ideas and subject to your approval. We make the metal, the dies and the tokens.

We have the experience, the equipment, the capacity for rapid quantity production.

*Information on request.*

### Scovill Mfg. Co.

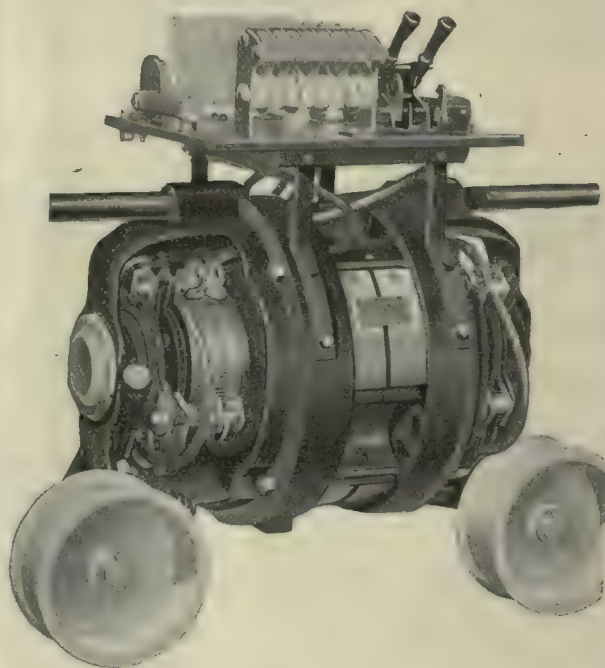
*Established 1802*

Waterbury, Conn.

New York  
Chicago

Boston  
Detroit

## BONDING TRACK REPAIRS SHOP WELDING



These are done with equal efficiency by the

### Lincoln Dynamotor

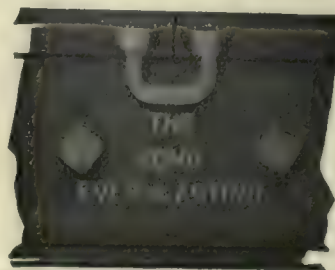
In the ordinary brazing machine the rail is heated all the way thru before the bond will stick.

*With the "Lincoln" you can put your hand opposite the weld the instant it is finished—will not burn your fingers.*

No heat or current wasted

**The Lincoln Bonding Co.**  
634 Huron Rd., Cleveland, O.

Lincoln Bonding Company, 30 Church Street, New York City.  
Charles N. Wood Company, 14 Federal Street, Boston, Mass.  
Railway Trackwork Company, 30th and Walnut Sts., Philadelphia, Pa.  
Electrical Engineering & Mfg. Co., First Nat. Bank Building, Pittsburgh, Penn.  
Chattanooga Armature Works, Chattanooga, Tenn.  
W. L. Rose Equipment Company, La Salle Building, St. Louis, Mo.  
Burton B. Stare Company, Yesler Way, Seattle, Wash.  
A. A. Wigmore, 441 Pacific Elec. Bldg., Los Angeles, Calif.  
Holden & White, Fisher Building, Chicago, Ill.





# Get that worn out track back to good condition—do it quick with the

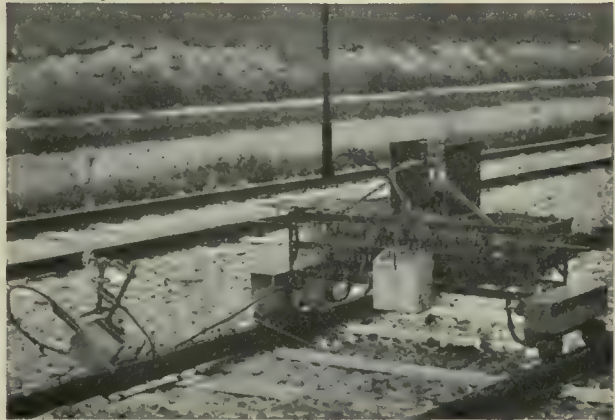
## ERICO

### Portable Welding Rheostats

Worn out track has been one of the most potent sources of loss during the past few years. If the repair of your track is a matter of rail bonds, building up broken switch points, etc., you cannot do better than use ERICO Portable Welders which weigh only 65 pounds and the Rheostat, weight 140 pounds. Easily moved and handled by two men.

Erico outfits represent a small investment, but bring large returns in saved time and labor.

The Rheostat can also find many uses in your shop for arc welding, and on account of its portability can be brought to the work.



*Write for full information.*

## The Electric Railway Improvement Co.

Cleveland, Ohio

## Years of Experience

is the basis on which this company recommends its carbon steels to the toolmaker for use in the manufacture of tools.

The materials used in their manufacture are of the best and if given proper heat treatment by the purchaser these steels will serve the same purpose as higher priced alloy steels.

Service failures are caused by the improper grade of steel or by defects in heat treatment.

This company has issued a pamphlet, Tool Steels, which will assist you in procuring that grade of steel which will best serve your purpose. It also gives a brief insight into the methods of heat treatment.

A copy of this pamphlet on your desk will be helpful.

Carnegie tool steels are sold through Carnegie Warehouses—write for quotations to any Carnegie Office.

## Carnegie Steel Company

General Offices, Carnegie Bldg., Pittsburgh, Pa.



## Where reliability must be assured—

*The lever on which the steady operation  
of your rolling stock depends—the gears*

**W**HEN a choice of gearing is necessary you will not use the first gear that comes to your hand. You **WILL** use the gear that has the characteristics that fit it for your particular service.

B P has what you demand. It is the gear that was developed primarily for Electric Railway service. We guarantee B P gears to give 4 times the life of untreated steel in identical service, minimizing breakdowns, maintenance and saving the time of replacements.

*Send for bulletins descriptive of heat treatment  
and its application to Steel Gearing.*

R. D. Nuttall Co., Pittsburgh, Pa.

# Nuttall Gears

EVERY GEAR REGISTERED



## Safety—Economy—Efficiency GRIFFIN F. C. S. WHEELS



Maximum  
Mileage

Minimum  
Cost



For Street and Interurban Railways  
We have adequate facilities at each foundry for mounting wheels on axles

## GRIFFIN WHEEL COMPANY

McCormick Building, Chicago, Ill.

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# "STANDARD"

Steel Tires                      Steel Tired Wheels  
                  Solid Rolled Steel Wheels  
                  O. H. Steel and Malleable Iron Castings  
                  Solid Forged Gear Blanks  
 Steel Forgings                      Iron Forgings  
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                  Steel Springs



*"The 'Standard' Brand on your material  
 is an assurance of eventual economy."*



## STANDARD STEEL WORKS CO.

GENERAL OFFICES:

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**Le Carbone**  
 Carbon Brushes are  
 uniform. They talk  
 for themselves.

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## BRAKE SHOE STANDARDS

SAVE MATERIAL  
 SAVE LABOR  
 SAVE TIME  
 SAVE MONEY

*Ask Us?*

**American Brake Shoe & Foundry Co.**  
 30 Church Street, New York

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THESE OFFICES WILL GIVE YOU THE BEST THERE IS IN INSURANCE SERVICE



**WEATHERPROOF WIRE  
AND CABLE**  
**PAPER INSULATED  
UNDERGROUND CABLE**  
(Single, Duplex and Three Phase)  
**TROLLEY WIRE**  
(Round, Grooved or Figure 8)  
**BARE COPPER WIRES AND  
CABLES**  
**MAGNET WIRE**  
(Cotton or Asbestos)

Americanite Rubber Covered Wire  
Incandescent Lamp Cord

Galvanized Iron and Steel  
Wire and Strand

**AMERICAN ELECTRICAL WORKS**

Phillipsdale, R. I.

Boston, 176 Federal; Chicago, 112 W. Adams; Cincinnati, Traction Bldg.;  
New York, 233 B'way; San Francisco, 612 Howard; Seattle, 100 1st Ave. So.

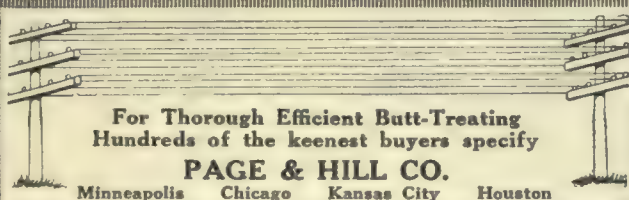
## Standard for Your Service

means securing the best quality of bare and insulated electric wires and cables and cable accessories that are guaranteed by years of unusually successful service.

Write our nearest office for complete information.

**Standard Underground Cable Co.**  
Pittsburgh, Pa.

Boston Philadelphia, Pa. Chicago  
New York San Francisco St. Louis  
And other Principal Cities



For Thorough Efficient Butt-Treating  
Hundreds of the keenest buyers specify

**PAGE & HILL CO.**

Minneapolis Chicago Kansas City Houston

Michigan

Western

**CEDAR POLES**  
POSTS, TIES AND PILING  
BUTT TREATING

**The Valentine-Clark Co.**

General Office: Minneapolis, Minn.  
Toledo, Ohio; Chicago, Ill.; Kansas City, Mo.; St. Maries, Idaho.

## THE LINDSLEY BROTHERS CO.

Western "Good Poles Quick" Northern

Quick Shipments Rooms 832 834, 72 West. Adams St.  
from our CHICAGO, ILL.  
Minneapolis Yard

Spokane — St. Louis

Butt Treating  
Open Tank and  
"Hot and Cold"  
Processes

## TIES

UPPER MICHIGAN WHITE CEDAR

WHITE MARBLE LIME CO., (Cedar Dept.) Manistique, Mich.

**WESTERN CEDAR POLES**  
General - B. J. CARNEY & Co. - Spokane, Wn.  
1729 McCormick Bldg. Chicago  
Quick Service Yard & Butt Treating Plant  
in Minneapolis

## FEDERAL SIGNAL CO. ALBANY, N. Y.

CONSULT OUR ENGINEERS ON YOUR  
SIGNAL REQUIREMENTS

52 Vanderbilt Avenue, New York. Monadnock Block, Chicago.  
118-130 New Montgomery St., San Francisco, Cal.

## Peirce Forged Steel Pins with Sheet Steel Thimbles

Your best insurance against insulator breakage

**Hubbard & Company**

PITTSBURGH, PA.

## EUREKA PRODUCTS

Commutators, Trolley Wheels, Sleet Trolley Wheels, Trolley  
Ears, Line Material, Controller Fingers, Brush Holders, etc.

We make quality goods

**THE EUREKA COMPANY, North East, Pa.**



High Grade Insulated Wires and Cables, Bare Iron,  
Steel and Copper Wire

**JOHN A. ROEBLING'S SONS COMPANY**  
TRENTON, NEW JERSEY

## "NATIONAL" TUBULAR STEEL POLES

are dependable, durable and efficient in service.  
For electric lines and power transmission, they  
are

The Recognized Standard of Quality

**NATIONAL TUBE COMPANY, PITTSBURGH, PA.**



## Aluminum Company of America

Manufacturers of

# ALUMINUM

## Electrical Conductors

All-Aluminum and Steel Reinforced  
for

Transmission Lines  
Railway and Industrial Feeders  
Signal Circuits  
Railway Catenary Construction  
Bus Bars

also

Ingots—Rods—Rivets—Extended Shapes  
Sheet Tubing

also

Aluminum Solders and Flux  
Flux and Wire for Autogenous Welding

### GENERAL SALES OFFICE

Oliver Bldg., Pittsburgh, Pa., U. S. A.

Canada: Northern Aluminum Co., Ltd., Toronto.

Latin America: Aluminum Co. of South America, Pittsburgh, Pa.

England: Northern Aluminium Co., Ltd., London.

## Steel Poles For Every Pole Purpose

Cut shows Bates Steel Poles in Electric Trolley Line Service by Des Moines City Ry. Co., Des Moines, Iowa. Over 2100 Bates Poles in use in Des Moines, mostly Trolley Service and some Street and Park lighting.

Bates Steel Poles are becoming universally popular. Repeat orders testify their general suitability for every Pole purpose, Telephone, Power Transmission, Electric Trolley Lines, Electric Lighting, etc. Highest class and most up-to-date steel pole equipment in the world. Our STEEL POLE TREATISE tells the story. Ask for it. About 2000 tons of steel constantly on hand; immediate shipments and lowest prices.

Tubular Steel Poles cost 50 per cent. more than Bates Steel Poles, yet Bates Poles are 100 per cent. stronger—will last 100 per cent. longer, cover a much broader range of adaptability and are much more artistic than Tubular Poles; ask us to verify these facts.

Bates  
Expanded Steel  
Truss Co.

208 S. La Salle St.  
Chicago, Ill.  
U. S. A.



Rome-Wire

Bare and Tinned Copper Wire  
Magnet Wire, Rubber Covered Wire  
Rome Wire Co., Rome, N. Y.

### DREW MONEY SAVERS

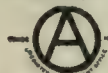
Drew Motorman's Safety Mirrors—Prevent Accidents.  
Drew Pole Sleeves—Make Old Steel Poles as Good as New.  
Samson Splicers—"Least cost per car Mile."  
Drew Frogs and Crossings—Obviate "trolley off."  
Drew Clinch Ears—Absolutely dependable.

Send for Drew Catalogue No. 18

DREW ELECTRIC & MANUFACTURING COMPANY  
Offices and Works, 1016 E. Michigan St., Indianapolis, Ind.

### AETNA INSULATION LINE MATERIAL

Third Rail Insulators, Trolley Bases, Harps and Wheels, Bronze and Malleable Iron Frogs, Crossings, Section Insulators, Section Switches.



Albert & J. M. Anderson Mfg. Co.

289-93 A Street, Boston, Mass.

Established 1877

Branches—New York, 135 B'way, Philadelphia, 429 Real Estate Trust Bldg. Chicago, 105 So. Dearborn St. London, 48 Milton Street



## Armco Welding Rods

OXY-ACETYLENE ELECTRIC

make safe welding easy

ARMCO Iron Rods are practically pure iron and are peculiarly free from the sulphur, phosphorus, slag, oxides and other impurities that ordinarily destroy the homogeneity of the weld.

You would find it decidedly to your advantage to give ARMCO Iron Rods a careful test.

## PAGE STEEL & WIRE CO.

Sales Offices: 30 Church St., New York

Plants: Monessen, Pa. and Adrian, Mich.

Western Representatives:

STEEL SALES CORPORATION, CHICAGO 11



## U. S. Electric Contact Signals for

Single-track block-signal protection.

Double-track spacing and clearance signals.

Protection at intersections with wyes.

Proceed signals in street reconstruction work.

United States Electric Signal Co.

West Newton, Mass.

Transmission Line and Special Crossing  
Structures, Catenary Bridges

WRITE FOR OUR NEW DESCRIPTIVE CATALOG.

ARCHBOLD-BRADY CO.

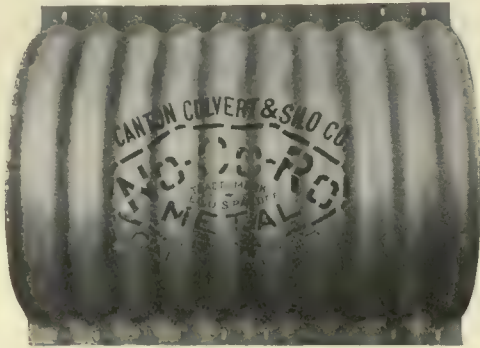
Engineers & Contractors

SYRACUSE, N. Y.

Chapman  
Automatic Signals  
Charles N. Wood Co., Boston







## Every Section Trademarked

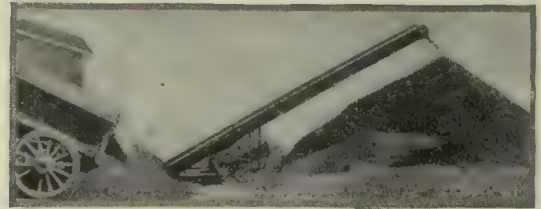
"ACMES" are a trademarked product—a standard reliable product.

No other corrugated culvert is made of the NO-CO-RO METAL (99.90% pure iron) that gives "ACMES" their unsurpassed lasting qualities.

**"ACME" (NESTABLE) CORRUGATED CULVERTS**

The sectional character of "ACMES" is a big advantage in handling and transportation. We'll ship them Set-up, however, if desired. Write for Catalog M-21.

**THE CANTON CULVERT & SILO CO.**  
MANUFACTURERS  
CANTON, OHIO, U.S.A.



## The SCOOP CONVEYOR

### A Time and Labor Saver

The quickest method ever devised for loading and unloading, storing and reclaiming. Takes the place of 6 to 12 men and keeps other equipment moving.

Easily portable. Power driven. Over half of the 1000 users have sent "repeat orders".

Write for Illustrated Literature

**PORTABLE MACHINERY**

**CO. Inc.**  
PASSAIC, N. J.



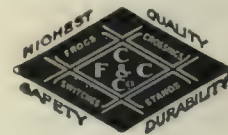
## BARBOUR-STOCKWELL CO.

205 Broadway, Cambridgeport, Mass.  
Established 1858

Manufacturers of  
**Special Work for Street Railways**  
Frogs, Crossings, Switches and Mates  
Turnouts and Cross Connections  
Kerwin Portable Crossovers  
Balkwill Articulated Cast Manganese Crossings  
ESTIMATES PROMPTLY FURNISHED

## HIGHEST QUALITY

### TRACK SPECIAL WORK



## WE MAKE THIS GRADE ONLY

**CLEVELAND FROG & CROSSING CO.**  
CLEVELAND, OHIO

## Dependable Track Work for Electric Railways



Frogs, Switches, Switch Stands, Crossings, Special Track Work, Machine and Drop Forgings, Pressed Steel and Hammer Work. Foundry for Manganese Steel Castings and special facilities for heat treating. Let us bid on your requirements.

**ST. LOUIS FROG & SWITCH CO.**  
ST. LOUIS, MO.

## T RAILS AND NELSONVILLE FILLER AND STRETCHER BRICK

offer all the advantages without the disadvantages of the grooved rail.

Construction approved by City Engineers.

**THE NELSONVILLE BRICK CO., Nelsonville, Ohio**

## RAMAPO

Automatic Safety and Automatic Return Switch Stands for Passing Sidings. Tee Rail Special Work for Interurban Lines and Private Rights of Way. Manganese Construction a Specialty.

**Ramapo Iron Works**  
HILLBURN, NEW YORK  
Plant at Hillburn, N.Y. and Niagara Falls, N.Y. New York Office, 30 Church Street



## SPECIALISTS

in the

**Design and Manufacture  
of**

**Standard—Insulated—and  
Compromise Rail Joints.**

**The Rail Joint Company  
61 Broadway, New York City**

AWARDED



## American Rail Bonds

**Crown  
United States  
Twin Terminal  
Soldered**

**American Steel & Wire Company**

Chicago New York Cleveland Pittsburgh Worcester Denver

Export Representative: U. S. Steel Products Co., New York

Pacific Coast Representative: U. S. Steel Products Co.  
San Francisco Los Angeles Portland Seattle

## SPECIAL TRACK WORK

**SWITCHES, FROGS AND CROSSINGS.  
ANTI-KICKING BIG HEEL  
SWITCHES.**



**TRACK WORK  
OF EVERY DESCRIPTION.  
HARD CENTER CONSTRUCTION.**

• Balkwill Articulated Cast Manganese Crossings

**New York Switch & Crossing Co.  
Hoboken, N. J.**

## THE WEISS SWITCH LOCK PREVENTS SPLIT SWITCHES

A positive locking switch lock that locks right and left. Water-proof, non-freezable, mud-proof and sand-proof. Simple in construction, perfect in operation and easily installed. Positively prevents split switches.

Write for complete information and quotations.

WEISS SWITCH LOCK CO., 600 Capitol Ave., Springfield, Ill.

## BLAW-KNOX COMPANY

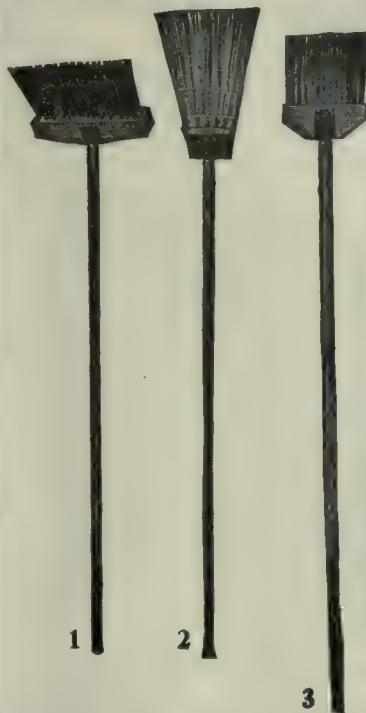
**"BLAW" TRANSMISSION TOWERS**

"BLAW" PATENTED TRANSMISSION TOWERS  
STEEL TUBES, BRACED, PATENTED, STEEL  
TUBES AND BRACED STEEL TUBES  
HIGH STRENGTH, "BLAW" TOWERS

Patented in U. S. and Foreign  
Manufactured in U. S. and Foreign

NEW YORK, N. Y. CHICAGO, ILL. PHILADELPHIA, PA.  
PITTSBURGH, PA. ST. LOUIS, MO. CLEVELAND, OH.  
DETROIT, MICH. INDIANAPOLIS, IND. CINCINNATI, OH.  
KANSAS CITY, MO. ST. PAUL, MINN. PORTLAND, ORE.  
SEATTLE, WASH. SPOKANE, IDAHO

## A Great Combination



**No. 1. Flat Wire, to  
sweep cross-  
ings.**

**No. 2. Split Bamboo,  
to handle light  
dirt and snow  
in the frogs,  
switches, and  
curves.**

**No. 3. Flat Wire, to  
remove ice,  
slush and mud  
from the same  
places and a  
chisel point on  
the end of the  
handle to  
loosen the ice  
and crust.**

None superior are  
produced for purposes  
intended. No. 1 sup-  
plied with or without  
handles, and No. 2  
and 3 have a chisel  
on the end of handle  
to cut the crust and  
ice, but are supplied  
without chisel if de-  
sired.

Write for prices

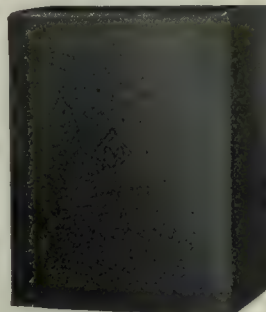
**J. W. PAXSON CO., Mfrs.  
1021 N. Delaware Ave., Philadelphia, Pa.**

## 32,680 MILES

was the distance covered before  
this set of brushes was in-  
spected. Even then they were  
in excellent condition and good  
for several thousand additional  
miles. Other brushes delivered  
18,000 or less.

## U S G Brushes

are especially designed for the serv-  
ice in which they are to operate.



**THE UNITED STATES GRAPHITE COMPANY**

Saginaw, Michigan, U. S. A.

Branch Offices: New York, Pittsburgh, Philadelphia, Atlanta,  
Chicago, St. Louis, Denver, San Francisco.

## WE-FU-GO AND SCAIFE

# WATER

**PURIFICATION SYSTEMS  
SOFTENING & FILTRATION  
FOR BOILER FEED AND  
ALL INDUSTRIAL USES**

**WM. B. SCAIFE & SONS CO. PITTSBURGH, PA.**

## HOT GALVANIZING

We guarantee immediate deliveries; reasonable prices; first  
class workmanship to stand any test. No tapping necessary on  
threads of bolts after galvanizing.  
Galvanized angles furnished cut and bent to length and punched.

**JOSEPH P. CATTIE & BROS.  
Gaul and Adams Sts., Philadelphia, Pa.**



## DO YOU USE CIRCUIT BREAKERS IN YOUR PLANT?

In Some Plants They Are Not Used  
Even Though Installed.

If You *Use* Circuit Breakers You Can  
Not Afford to Overlook The



### AUTOMATIC RECLOSING CIRCUIT BREAKER

Which knows when  
to reclose as well as  
when to open.

You will find it most  
practical and eco-  
nomical.

*Protect your equipment  
Reduce your costs  
Eliminate your delays*

Write for Bulletin No. 30.

**The Automatic Reclosing Circuit  
Breaker Co.**

Columbus, Ohio

U. S. A.

### Full power with High or Lower Adjustment

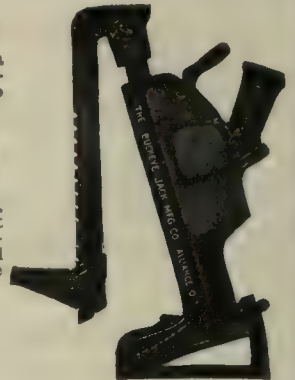
Many emergencies requiring a  
powerful jack present a diffi-  
culty in bringing the jack to  
bear on the load. The

### Buckeye Emergency Jack No. 239 Special

saves time, strength and trouble.  
The many positions to which it  
is adjustable easily solve per-  
plexing lifting problems. Full  
details in our catalog. Write  
for it.

**The Buckeye  
Jack Mfg. Co.**

Alliance, Ohio



## NILES-BEMENT-POND CO.

111 BROADWAY, NEW YORK

### MACHINE TOOLS

*For Electric Railway Repair Shops*

Axle Lathes  
Wheel Presses  
Shapers, Drills  
Slotters, Planers  
Steam Hammers  
Electric Travelling  
Cranes

Send  
for  
Catalogs



## The Babcock & Wilcox Company

85 Liberty Street, New York

## WATER TUBE STEAM BOILERS

Steam Superheaters

Mechanical Stokers

Works: BARBERTON, OHIO—BAYONNE, N. J.

### BRANCH OFFICES:

ATLANTA, Candler Building  
BOSTON, 49 Federal St.  
CHICAGO, Marquette Building  
CINCINNATI, Traction Building  
CLEVELAND, Guardian Building  
DENVER, 435 Seventeenth St.

HAVANA, CUBA, Calle de Aguilar 104  
HOUSTON, TEXAS, Southern Pacific Bldg.  
LOS ANGELES, I. N. Van Noy Bldg.  
NEW ORLEANS, 533 Baronne St.  
PHILADELPHIA, North American Bldg.  
PITTSBURGH, Farmers' Deposit Bank Bldg.

SALT LAKE CITY, 705-6 Kearns Bldg.  
SAN FRANCISCO, Sheldon Bldg.  
SAN JUAN, Porto Rico, Royal Bank Bldg.  
SEATTLE, Mutual Life Bldg.  
TUCSON, ARIZONA, Santa Rita Hotel Bldg.

## Foster Superheaters

Insure uniform superheat at temperature specified

**Power Specialty Company**

111 Broadway, New York City

## LEADING TRACTION COMPANIES

Drive Their Auxiliaries with

**THE TERRY TURBINE**

Terry Steam Turbine Co., Hartford, Conn.



## I. T. E. Circuit Breakers

for heavy street railway work are  
the best obtainable. Write for New  
Complete Catalogue.

## GREEN CHAIN CRATES

GREEN ENGINEERING CO., East Chicago, Ind.



LET  
**TOLEDO CRANES**  
LIFT YOUR LOAD



Get in touch with us

**TOLEDO BRIDGE & CRANE CO.**  
TOLEDO, OHIO

New York Office, 52 Broadway  
Philadelphia Office, 2013 Market St.  
Pittsburgh Office, 203 Oliver Bldg.

Cleveland Office, 725 Citicorp Bldg.  
Chicago Office, 549 Washington Bldg.  
San Francisco Office, Rialto Bldg.

**"It Behooves You  
to Hooverize Your  
Motormen"**

We can help you

Write to

**The Arthur Power-Saving Recorder Co.**  
2nd National Bank Bldg., New Haven, Conn.

**FORD TRIBLOC**

A Chain Hoist that excels in every feature. It has Planetary Gears, Steel Parts,  $3\frac{1}{2}$  to 1 factor of Safety. It's the only Block that carries a five-year guarantee.

**FORD CHAIN BLOCK & MFG. CO.**  
Second and Diamond Sts., Philadelphia



**The Economy  
Railway Meter**  
Induces  
Power Saving.

Our power-saving bulletin  
will vitally interest you right  
now. Ask for them.



**Economy Electric Devices Co., Chicago**

The Big Three

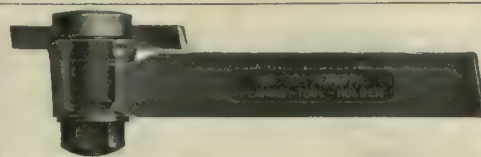
**D & W Fuses, Deltabeston Wire  
D & W Oil Fuse Cutouts**

**D & W Fuse Co., Providence, R. I.**



of  
Quality

**STANDARD**  
Woven Fabric Co  
Walpole, Mass.



**Williams' "Agrippa"  
Tool Holders**

Save the most machine time  
on the job, lose the least re-  
pair time off the job and need  
the least shifting between  
jobs. Carried in stock in a  
wide range of sizes for

TURNING  
BORING  
PLANING

THREADING  
KNURLING  
CUTTING OFF  
SIDE WORK

Ask for *Machinists' Tools Booklet*

**J. H. Williams & Co.**

*"The Drop-Forging People"*

143 Richards Street, Brooklyn, New York  
143 South Clinton Street, Chicago

**WE CAN CUT YOUR COST OF  
HEATING CURRENT**

Write for THERMOSTATIC CONTROL INFORMATION

**GOLD**

**ELECTRIC HEATERS** Cut  
Installation and Maintenance  
Charge.

**VENTILATORS** Also Ventilate in Stormy Weather.

**THERMOSTATS** Save Current.

ORIGINATED the use of  
**NON-CORROSIVE** Wire for  
Electric Car Heaters.

ORIGINATED The Ventilated  
Coil Support.

LET US FIGURE ON YOUR NEXT REQUIREMENTS  
**Gold Car Heating & Lighting Co., 17 Battery Pl., New York**



**"Everything in Insulation"**

Mica  
Vulcanized Fibre  
Varnished Cloth  
Insulating Tapes

Waxes  
Asphalts  
Compounds  
Insulating Varnish

The above are only a few of our products  
Write us for anything in this line you may require.

**MITCHELL-RAND M'FG CO.**

103 John St., New York City

**Simplex Jacks**

for  
Railroads-Contractors-Industries  
Automobiles-Pole Pulling and Ordnance

**Templeton, Kenly & Co., Ltd.**

London Chicago Paris



## International Specialties Cover the Entire Range of Fare Collection

Money-counting fare boxes; Coin and metal ticket-counting fare boxes; Coin registers; Coin and transfer registers; Coin, metal ticket and transfer registers; Motor-driven coin and transfer registers; Motor-driven registers for station, ferry, park and terminal use; Metal and paper registers with single hopper; Round and square registers; Transfer printers; Heeren Enameled Badges; Punches and Bell Cord.

**The International Register Company**  
15 South Throop Street, Chicago



**Hale & Kilburn**  
*No. 108-AV Stationary Seat  
For One-Man Safety Cars.*

The unmatched H&K Seat beats the world for strength and lightness. Every Safety Car should be equipped with it.

**HALE & KILBURN CORPN.**

New York	Philadelphia	St. Louis
Detroit	Chicago	Atlanta
Louisville	Washington	Dallas
	San Francisco	

**MASON SAFETY TREAD**—Lead or carborundum filled; non-slippery; prevents accidents; cuts out damage suits.  
**KARBOLITH CAR FLOORING**—For steel cars; is sanitary, light weight fire proof, non-slippery.  
**STANWOOD STEPS**—Self-cleaning, non-slippery, light. Over six million feet used without accident being reported within the knowledge of manufacturer.  
Our products used on all leading railroads on cars and stations. For details address:  
**AMERICAN MASON SAFETY TREAD CO., Lowell, Mass.**  
Branch Offices: Boston, New York City, Philadelphia.  
Agencies in all principal cities.

## Heating and Ventilating

Let us demonstrate to you how we can heat and ventilate your cars at the lowest possible cost

**The Cooper Heater Company**  
Carlisle, Pa.

75% of the electric railways

use

**B-V Punches**

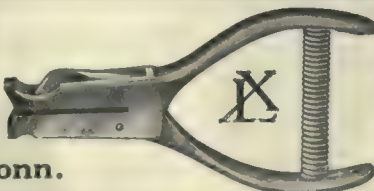
Send for Catalog.

**BONNEY-VEHSLAGE TOOL CO., Newark, N.J.**



**EXELL  
MFG. CO.**

New Haven, Conn.



Electric car heaters—thermostatic control—pneumatic car door operators—buzzers, single-stroke bells, starting signal lights—special resistances.

**CONSOLIDATED CAR HEATING CO.**  
ALBANY, NEW YORK, CHICAGO



Use them in your terminals—**PEREY TURNSTILES**  
or **PASSIMETERS**

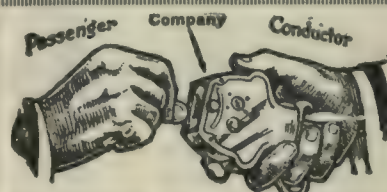
*Faster than the ticket seller*

**Perey Manufacturing Co., Inc.**  
30 Church Street, New York City

## FUEL CONSERVATION

is a necessity and the heating and ventilating of street cars should be accomplished the most economical way. Our Hot Air Forced Ventilation Equipment combines heat with ventilation at a saving of 50% to 70% over electric heat.

**THE PETER SMITH HEATER CO. DETROIT, MICH.**



**Direct  
Automatic  
Registration**  
By the  
**Passenger**

**Rooke Automatic  
Register Co.**  
Providence, R. I.





## FOR SALE INTERURBAN CAR

Length over body, 43 ft. 0 in.  
 Length over dasher, 52 ft. 0 in.  
 Length over buffers, 53 ft. 6 in.  
 Width of panels at sills, 8 ft. 4 in.  
 Height from top of floor to ceiling, 8 ft. 2 $\frac{3}{8}$  in.  
 Height from bot. of sill to top of roof, 9 ft. 2 $\frac{3}{8}$  in.  
 Height from top of rails to top of roof, 12 ft. 6 in.  
 Bumpers, angle iron 6 in. x 3 in. Brill.  
 Brakes, air and hand, 10 in. brake cylinder.  
 Draw bars, VanDorn.  
 Fender, Providence.  
 Gongs, 12 in. dedenda.  
 Headlights, Crouse-Hinds.  
 Roof covering, No. 8 duck, 3 coats of red graphite paint.  
 Trolleys, U. S. No. 6.

Car lines, wood.  
 Trolley catchers, Wilson.  
 Curtains, canvas.  
 Heaters, none.  
 Interior finish, natural wood finish.  
 Seats, Wheeler.  
 Trucks, Brill No. 27-T, 31 ft. centers.  
 Axles, Midvale heat treated, 5 in. dia., gear seat 6 in.  
 Wheel base, 72 in.  
 Wheels, 34 in.  
 Gauge, 4 ft. 8 $\frac{1}{2}$  in.  
 Controllers, 2 G. E. K-14.  
 Motors, 4 G. E. 57-2 turn—Form H.  
 Gear teeth, 63—Grade M.  
 Pinion teeth, 24—Grade M.

# W. R. Kerschner Co., Inc.

50 Church Street, New York



# SEARCHLIGHT SECTION

## Get Your Wants into the Searchlight

### ADVERTISING RATES

#### Ads Set in Uniform Style

(Solid, in one paragraph, without display.)

**THREE CENTS A WORD**, minimum charge 50 cents an insertion, payable in advance, less 10 per cent. If one payment is made in advance for four continuous insertions—for advertisements under:

Positions Wanted      Vacation Work Wanted  
Evening Work      Salesman Wants Con-  
Wanted      nections

**FIVE CENTS A WORD**, minimum charge \$1.50 an insertion, for advertisement under:

Agencies Wanted      Positions Vacant  
Agents Wanted      Partner Wanted  
Business Opportunities      Representations Wanted  
Desk Room for Rent      Salesmen Wanted  
Educational      Patents for Sale  
Employment Agencies      Plants for Sale  
Desk Room Wanted      Sub-Contracts Wanted  
Foreign Business      Work Wanted  
Miscellaneous for Sale, for Rent or Want Ads.

**THIRTY CENTS A LINE**, minimum five lines, for all undisplayed advertisements set with a paragraph for each item or tabulated.

**THREE DOLLARS AND SIXTY CENTS AN INCH** for advertisements for bids (Official Proposals).

#### Ads Set in Display Type

(Individual space, within border rules.)

Space for these advertisements is sold by the inch. Each page contains 30 inches. The rate per inch is based on the total number of inches to be used—that is, the number of inches the advertisement is to occupy multiplied by the number of insertions it is to receive. For instance, a 2-inch advertisement in 2 issues earns the 4-inch rate of \$2.90 an inch. A 1-inch space for 4 issues, or a 4-inch space in one issue, also earn the 4-inch rate.

#### SCHEDULE OF RATES

1 to 3 in., \$3.00 an in.      15 to 25 in., \$2.70 an in.  
4 to 7 in., 2.90 an in.      27 to 49 in., 2.60 an in.  
8 to 14 in., 2.80 an in.      50 to 99 in., 2.50 an in.

Rates for larger space furnished on request.

*For quick and satisfactory results  
tell the reader everything that  
he will want to know.*

### INFORMATION

**ALLOW FIVE WORDS** for the address, if replies are to a box number in care of any of our offices. There is no extra charge for forwarding replies.

**IN REPLYING TO ADS**, do not enclose original testimonials or anything that you may want returned. State your experience and qualifications in as concise and neat a manner as possible and enclose copies of your testimonials.

**BE CAREFUL TO PUT ON ENVELOPE**, when answering any "blind" ad, the box number in the ad, the name of the paper, and also the local address of office to which reply is sent:

36th St., at 10th Ave., New York  
935 Real Estate Trust Bldg., Philadelphia  
657 Leader-News Bldg., Cleveland  
1570 Old Colony Bldg., Chicago  
519 Newhouse Bldg., Salt Lake City  
501 Rialto Bldg., San Francisco

**WHEN ADVERTISING MACHINERY**, use your own name and address—or a local address of some kind—so that the readers can wire direct and get quick replies. We advise also that you state in your advertisement the present location of plant that is offered for sale, or point of delivery provided you are in the market for equipment.

**TO SIGN YOUR NAME** and address to your advertisement begets the confidence of the reader and facilitates receiving replies. You can, however, obviate delay in receiving answers by signing your ad. only with initials (your own or others), care of your home, your office or a post-office box number in your city.

### POSITIONS VACANT

**AUDITOR**, with experience in railway and lighting accounting and capable of taking charge of office of company doing a business of two and one-half million per year. State age, experience, education and present salary. All replies treated strictly confidential. P-371, Elec. Ry. Journal.

**HIGH-GRADE master mechanic** wanted for street railway system in Texas city of 25,000. P-342, Elec. Ry. Journal, Chicago.

**LIVE**, energetic young man wanted to act as shop foreman of small suburban system in Northern Alabama. Excellent opportunity for advancement to right party. State fully experience and salary expected. P-372, Elec. Ry. Journal, Leader-News Bldg., Cleveland.

**MAN** wanted, experienced in electric railway track work, as shop inspector for frog and switch manufacturer; also draftsman who has had experience in designing manganese special track work. State salary and experience in first letter. P-361, Elec. Ry. Journal, Chicago.

**NAMES** and addresses wanted of competent English-Spanish translators in various localities east of Chicago who can work part time. P-369, Elec. Ry. Journal.

**POWER** house chief engineer wanted; man of experience, thoroughly conversant with high voltage generation and distribution. Pittsburgh, Harmony, Butler & New Castle Railway Co., No. 124 Stanwix Street, Pittsburgh, Pa.

### POSITIONS WANTED

**CAR BARN** foreman wants position; 10 years' experience, armature winder, machinist, electrician, electric car equipment and maintenance; interurban and city. PW-374, Elec. Ry. Journal.

### POSITIONS WANTED

**CHIEF** engineer or engineer maintenance of way. 12 years' experience maintenance, construction and operation. Accurate knowledge of all matters related to way and structure department. Technically trained. References. PW-367, Elec. Ry. Journal, Chicago.

**ENGINEER** and executive; technical; 15 years electric railway experience; designs, construction, maintenance of way, investigations, reports, extensive valuations, large utilities. In responsible charge, desires change; age, 37; best references. PW-373, Elec. Ry. Journal, Chicago.

**MASTER** mechanic, 40 years old, now employed, desires change. 18 years' experience city and high speed interurban, all classes modern equipment including high voltage. Record for efficient maintenance. High class reference from present employer and others. Address PW-375, Elec. Railway Journal, Chicago.

**OVERHEAD** man with 17 years' experience on construction and maintenance of City and Interurban lines, wishes position as superintendent or general foreman. Successful in organizing and handling men. PW-364, Elec. Ry. Journal, Philadelphia.

**POSITION** as sales manager wanted for producing company handling anthracite middle states and Canada; 25 years' experience in shipping to these points. P. O. Box 173, Elmira, N. Y.

### FOR SALE

**Fare Registers** For Sale  
20 R-5 International fare registers, A-1 condition. Address C. S. B. & N. I. Ry. Co., South Bend, Ind.

### 1000 TONS

## NEW 7 in. HIGH TEE RAIL

Bethlehem Steel Co. P. S. Co.  
Section 91-282. Same as L. S. Co's Section 91-375.

**For immediate delivery. Reasonable price. Will sell any quantity up to 1000 tons.**

Apply F. S. 369, Electric Railway Journal  
10th Ave. at 36th St., New York City

## CLEVELAND ARMATURE WORKS

Incorporated  
Cleveland, Ohio

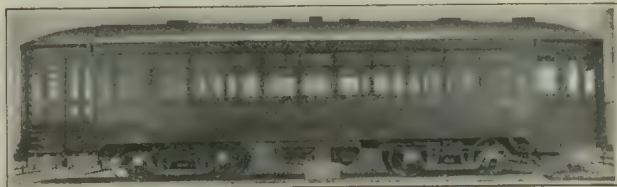
## Everything in the Line of Repairs to Electrical Machinery

Complete Armatures, New Armatures, Rewound Armature Ceres, Armature Shafts, Armature Coils, Fields and Commutators.

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Keep your eye on the  
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### IMMEDIATE DELIVERY

Five new P.A.Y.E. double truck cars. Length, 45-ft. Equipped with 4GE Co.'s 247 Motors and G. E. Co. Air Brakes.

**McGUIRE-CUMMINGS MANUFACTURING CO.**  
Cars and Trucks, Snow Sweepers, Electric Locomotives  
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the equipment or machinery  
that you are not now using.

This may be occupying valuable  
space, collecting dust, rust and hard  
knocks in your shops and yards.

**Sell it Before depreciation Scraps it.**

*The Searchlight Section is helping others  
—let it help you also.*

505

## ROTARY CONVERTERS

- 1—300-kw. Westinghouse Rotary Converter, 3-ph., 60-cy., 370-v. A.C., 575-v. D.C., 600 r.p.m.
- 1—200-kw. Westinghouse Rotary Converter, 3-ph., 60-cy., 370-v. A.C., 575-v. D.C.
- 1—150-kw. Westinghouse Rotary Converter, 2 or 3-ph., 60-cy., 250-v. D.C., 720 r.p.m.

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- 1—500-kw. Westg. Horizontal, 3-ph., 60-cy., 370-v. (can be rewound for any standard voltage), 3600 r.p.m., with or without condensing equipment.

### ARCHER & BALDWIN, INC.

114-118 Liberty St., New York, N. Y.  
Telephone 4337-4338 Rector

## SURFACE CONDENSERS

- 1—8000-sq.ft. Alberger.
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- 1—1380-sq.ft. Worthington.
- 1—1200-sq.ft. C. H. Wheeler.
- 1—1150-sq.ft. Wheeler Cond. & Eng'g Co.
- 1—700-sq.ft. Wheeler Cond. & Eng'g Co.
- 1—525-sq.ft. Frick.

### MacGovern & Company, Inc.

114 Liberty Street, New York, N. Y.  
Pittsburgh Office, 498 Union Arcade Building



We own and offer for sale  
a used McKean Motor 71-  
Passenger Car, all steel.  
In first class condition.  
Write or wire us for fur-  
ther information.

### HYMAN-MICHAELS CO.

People's Gas Building, Chicago  
Phone: Harrison 1100

New and Relaying Rails

BUYERS OF ABANDONED RAILROADS

### FOR QUICK SALE

8—Closed, 31-Ft.

### MOTOR CARS

Length of body 22 ft. 9 in. Longi-  
tudinal seats. Mounted on Brill  
21-E single trucks, wheel base  
7 ft. 6 in. Westinghouse No. 38  
motors. Excellent condition.

Price reasonable.

The Northern Ohio Traction & Light Co.  
Akron, Ohio

**Cars, Rails, Locomotives,  
Cranes, Generators, Turbines,  
Motors, Machine Tools,  
Hammers, Presses**

Everything For  
POWER, RAILROADS, INDUSTRY,  
CONTRACTORS

What do you want to Buy or Sell?  
Write for our Bulletin No. 119.

Our **ENGINEERING DEPARTMENT** will  
Design, Construct and Finance your  
undertakings. Send us particulars.

**RAILWAY & POWER EQUIPMENT CO.**  
Woolworth Bldg., New York, N. Y.  
Telephones: Barclay 3251-3252

## RAILS

15,000 TONS—NEW and RELAYERS  
NEW—12 lb., 16 lb., 30 lb., 35 lb., 36 lb.,  
40 lb., 60 lb., 70 lb., 75 lb., 80 lb., 88  
lb., 90 lb.  
RELAYERS—30 lb., 35 lb., 40 lb., 45 lb.,  
55 lb., 60 lb., 70 lb., 80 lb., 85 lb., 90  
lb., 100 lb.

Fas alings, New Bolts, Nuts and Spikes.  
New Frogs, Switches, Crossings and all  
accessories. Carload and less carload in-  
quiries and orders a specialty. Rails cut  
to lengths for structural purposes. At-  
tractive prices. Immediate shipments from  
stock.

L. B. FOSTER COMPANY  
Park Bldg., Pittsburgh, Pa.

## Cars For Sale

12 Double Truck Motor or  
Trailers. Brill 27-F trucks,  
28-ft. closed bodies.

### 3 SNOW PLOWS

2 single, 1 double truck

**ELECTRIC EQUIPMENT CO.**  
Commonwealth Bldg. Philadelphia, Pa.

### FOR SALE CARS

- 2—McKean Gaso-Electric Cars.
- 12—Differential 20-yd. Cars.
- 5—Gasoline Passenger Cars.
- 50—Freight Cars.
- 12—Electric Sets.

Get our Lists and Prices  
J. F. DONAHOO CO. Birmingham, Ala.

**SEARCHLIGHT  
SERVICE  
SECURES**

**SATISFACTORY  
SITUATIONS  
SALES**



# WHAT AND WHERE TO BUY

Equipment, Apparatus and Supplies Used by the Electric Railway Industry with  
Names of Manufacturers and Distributors Advertising in this Issue

**Advertising, Street Car**  
Collier, Inc., Barron G.

**Air Rectifiers**  
Holden & White, Inc.

**Anchor, Guy**  
Electric Service Supplies Co.  
Holden & White, Inc.  
Johns-Manville Co., H. W.  
Ohio Brass Co.  
Westinghouse Elec. & M. Co.

**Ash Storage Tanks, Cast Iron**  
Green Engineering Company

**Automobiles and Buses**  
Brill Co., The J. G.

**Axle Straighteners**  
Columbia M. W. & M. I. Co.

**Axles, Car Wheel**  
Bemis Car Truck Co.  
Brill Co., The J. G.  
Carnegie Steel Co.  
National Railway Appliance Co.  
St. Louis Car Co.  
Standard Steel Works Co.  
Westinghouse Elec. & M. Co.

**Babbitt Devices**  
Columbia M. W. & M. I. Co.

**Badges and Buttons**  
Electric Service Supplies Co.  
International Register Co., The

**Batteries, Dry**  
Johns-Manville Co., H. W.  
Nichols-Lintern Co.

**Batteries, Storage**  
Electric Storage Battery Co.

**Bearings and Bearing Metals**  
Bemis Car Truck Co.  
Clark Elec. & Mfg. Co.  
Columbia M. W. & M. I. Co.  
Eureka Co.  
General Electric Co.  
Kerschner Co., Inc., W. R.  
More-Jones Brass & Metal Co.  
St. Louis Car Co.  
Westinghouse Elec. & M. Co.

**Bearings, Center and Roller Side**  
Holden & White, Inc.

**Bearings, Oilless, Graphite, Bronze and Wood**  
Bound Brook Oil-less Bearing Co.

**Bells and Gongs**  
Brill Co., The J. G.  
Columbia M. W. & M. I. Co.  
Electric Service Supplies Co.  
St. Louis Car Co.

**Benders, Rail**  
Niles-Bement-Pond Co.  
Zelnicker, Walter A., Supply Co., Inc.

**Boiler Cleaning Compounds**  
Johns-Manville Co., H. W.

**Boilers**  
Babcock & Wilcox Co.

**Boiler Tubes**  
National Tube Co.

**Boiler Coverings**  
Johns-Manville Co., H. W.

**Bond Testers**  
American Steel & Wire Co.  
Lincoln Bonding Co.

**Bonding Apparatus**  
American Steel & Wire Co.  
Electric Railway Improvement Co.  
Electric Service Supplies Co.  
Lincoln Bonding Co.  
Ohio Brass Co.

**Bonds, Rail**  
American Steel & Wire Co.  
Electric Railway Improvement Co.  
Electric Service Supplies Co.  
General Electric Co.  
Lincoln Bonding Co.  
Johns-Manville Co., H. W.  
Ohio Brass Co.  
Westinghouse Elec. & M. Co.

**Boring Tools, Car Wheel**  
Niles-Bement-Pond Co.

**Brackets and Cross Arms (See also Poles, Ties, Posts, Etc.)**  
Bates Expanded Steel Truss Co.  
Hubbard & Co.  
Lindsley Bros. Co.  
Ohio Brass Co.

**Brake Adjusters**  
Holden & White, Inc.  
Westinghouse Traction Brake Co.

**Brake Shoes**  
Amer. Brake Shoe & Fdry. Co.  
Barbour-Stockwell Co.  
Brill Co., The J. G.  
Columbia M. W. & M. I. Co.  
St. Louis Car Co.

**Brakes, Brake Systems and Brake Parts**  
Bemis Car Truck Co.  
Brill Co., The J. G.  
Columbia M. W. & M. I. Co.  
General Electric Co.  
Holden & White, Inc.  
National Brake Co.  
St. Louis Car Co.  
Safety Car Devices Co.  
Westinghouse Trac. B. Co.

**Brick, Fire**  
Green Engineering Co.

**Brooms, Track, Steel or Batten**  
Paxson Co., J. W.  
Zelnicker, Walter A., Supply Co., Inc.

**Brushes, Carbon**  
General Electric Co.  
Jeandron, W. J.  
Morgan Crucible Co.  
United States Graphite Co.  
Westinghouse Elec. & M. Co.

**Brushes, Graphite**  
United States Graphite Co.

**Brush Holders**  
Anderson Mfg. Co., A. & J. M.  
Columbia M. W. & M. I. Co.  
Eureka Co.

**Buckets**  
Blaw-Knox Company

**Bushings, Case Hardened & Man-  
ufactured**  
Bemis Car Truck Co.

**Bushings, Graphite and Wooden**  
Bound Brook Oil-less Bearing Co.

**Cables. (See Wires and Cables.)**

**Carbon Brushes. (See Brushes, Carbon.)**

**Car Equipment. (For Fenders, Heaters, Registers, Wheels, etc.—See those headings.)**

**Car Trimmings. (For Curtains, Registers, Doors, Seats, etc.—See those headings.)**

**Car Panel Safety Switches**  
Westinghouse Elec. & Mfg. Co.

**Cars, Passenger, Freight, Express, etc.**  
American Car Co.  
Brill Co., The J. G.  
Kuhlman Car Co., G. C.  
McGuire-Cummings Mfg. Co.  
National Safety Car & Equipment Co.  
St. Louis Car Co.  
Wason Mfg. Co.

**Cars, Second Hand**  
Electric Equipment Co.  
Kerschner Co., Inc., W. R.

**Cars, Self-Propelled**  
Electric Storage Battery Co.  
General Electric Co.

**Castings, Brass, Composition or Copper**  
Anderson Mfg. Co., A. & J. M.  
Clark Elec. & Mfg. Co.  
Columbia M. W. & M. I. Co.  
Eureka Co.  
More-Jones Brass & Metal Co.

**Castings, Gray Iron and Steel**  
American Steel Foundries.  
Bemis Car Truck Co.  
Columbia M. W. & M. I. Co.

**St. Louis Car Co.**  
Standard Steel Works Co.

**Castings, Malleable and Brass**  
Amer. Brake Shoe & Fdry. Co.  
Bemis Car Truck Co.  
Columbia M. W. & M. I. Co.  
St. Louis Car Co.

**Catchers and Retrievers, Trolley**  
Electric Service Supplies Co.  
Holden & White, Inc.  
Kerschner Co., Inc., W. R.  
Ohio Brass Co.  
Wood Co., Chas. N.

**Circuit Breakers**  
Automatic Reclosing Circuit Breaker Co.  
The Cutter Electrical & Mfg. Co.  
General Electric Co.  
Westinghouse Elec. & Mfg. Co.

**Clamps and Connectors for Wires and Cables**  
Anderson Mfg. Co., A. & J. M.  
Electric Service Supplies Co.  
General Electric Co.  
Hubbard & Co.  
Ohio Brass Co.  
Westinghouse Elec. & Mfg. Co.

**Cleaners and Scrapers Track—(See also Snow-Plows, Sweepers and Brooms.)**  
Brill Co., The J. G.  
Ohio Brass Co.

**Clusters and Sockets**  
General Electric Co.

**Coal and Ash Handling—(See Conveying and Hoisting Machinery.)**

**Coil Banding and Winding Machines**  
Columbia M. W. & M. I. Co.  
Electric Service Supplies Co.

**Coils, Armature and Field**  
Cleveland Armature Works.  
Columbia M. W. & M. I. Co.  
D & W Fuse Co.  
General Electric Co.  
Independent Lamp & Wire Co.  
Rome Wire Co.  
Westinghouse Elec. & M. Co.

**Coils, Choke and Kicking**  
Electric Service Supplies Co.  
General Electric Co.  
Westinghouse Elec. & M. Co.

**Coin-Counting Machines**  
International Register Co., The

**Commutator Slotters**  
Electric Service Supplies Co.  
General Electric Co.  
Westinghouse Elec. & Mfg. Co.  
Wood Co., Chas. N.

**Commutator Truing Devices**  
General Electric Co.

**Commutators or Parts**  
Cameron Electrical Mfg. Co.  
Cleveland Armature Works.  
Columbia M. W. & M. I. Co.  
Eureka Co.  
General Electric Co.  
Westinghouse Elec. & Mfg. Co.

**Compressors, Air**  
Chicago Pneumatic Tool Co.  
General Electric Co.  
Westinghouse Trac. B. Co.

**Concrete Mixers**  
Blaw-Knox Co.

**Condensers**  
General Electric Co.  
Westinghouse Elec. & Mfg. Co.

**Conduits, Underground**  
Johns-Manville Co., H. W.

**Connectors, Solderless**  
Westinghouse Elec. & Mfg. Co.

**Controller Fingers**  
Trigger Lock Reversible Controller Finger

**Controller Regulators**  
Electric Service Supplies Co.

**Controllers or Parts**  
Columbia M. W. & M. I. Co.  
General Electric Co.

**Johns-Manville Co., H. W.**  
Kerschner Co., Inc., W. R.  
Westinghouse Elec. & Mfg. Co.

**Controlling Systems**  
General Electric Co.  
Westinghouse Elec. & Mfg. Co.

**Converters, Rotary**  
General Electric Co.  
Westinghouse Elec. & Mfg. Co.

**Conveying and Hoisting Machinery**  
Columbia M. W. & M. I. Co.  
Green Engrg. Co.

**Conveyors, Belt**  
Portable Machinery Co.

**Conveyors, Coal and Ash**  
Portable Machinery Co.

**Conveyors, Portable**  
Portable Machinery Co.

**Cord, Bell, Trolley, Register, etc.**  
Brill Co., The J. G.  
Electric Service Supplies Co.  
International Register Co., The  
Samson Cordage Works.

**Cord Connectors and Couplers**  
Electric Service Supplies Co.  
Samson Cordage Works.  
Wood Co., Chas. N.

**Couplers, Car**  
Brill Co., The J. G.  
Ohio Brass Co.  
Van Dorn Coupler Co.  
Westinghouse Trac. B. Co.

**Cranes**  
Toledo Bridge & Crane Co., The

**Croosoting. (See Wood Preservatives)**

**Cross Arms. (See Brackets)**

**Crossing Foundations**  
International Steel Tie Co.

**Crossing Signals. (See Signals, Crossing)**

**Crossings, Track. (See Track, Special Work)**

**Culverts**  
Armco Iron Culvert & Flume Mfrs. Assn.  
Canton Culvert & Silo Co.

**Curtains and Curtain Fixtures**  
Brill Co., The J. G.  
Electric Service Supplies Co.  
St. Louis Car Co.

**Dealers' Machinery**  
Archer & Baldwin  
Cleveland Armature Wks.  
Electric Equipment Co.  
Foster Co., L. B.  
Griswold Machine Co., Geo. M.  
Hyman Michaels Co.  
MacGovern & Co., Inc.  
Zelnicker Supply Co., Inc., Walter A.

**Derailing Devices. (See also Track Work)**  
Cleveland Frog & Crossing Co.

**Destination Signs**  
Columbia M. W. & M. I. Co.  
Electric Service Supplies Co.

**Detective Service**  
Wish Service, Inc., P. Edward

**Dogs, Lathe**  
Williams & Co., J. H.

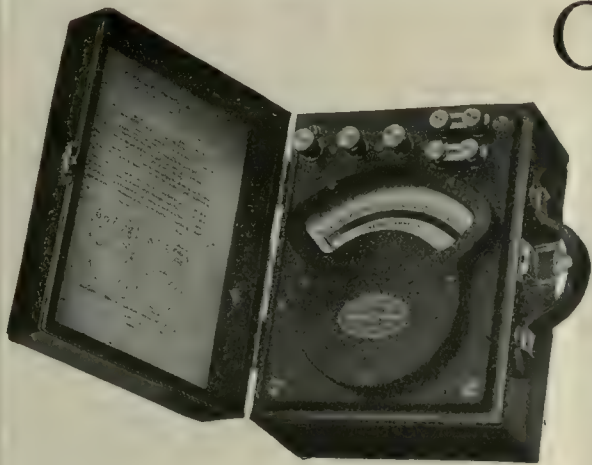
**Door Operating Devices**  
Consolidated Car Heating Co.  
National Pneumatic Co., Inc.  
Safety Car Devices Co.

**Doors and Door Fixtures**  
Brill Co., The J. G.  
General Electric Co.  
Hale & Kilburn Corp.

**Doors, Folding Vestibule**  
National Pneumatic Co., Inc.

**Draft Rigging. (See Couplers)**





**Model 370—A. C. and D. C. Ammeter**

One of the Portable Electrodynamometer Group, which also includes Model 310 Single Phase and D.C. Wattmeter, Model 329 Poly-phase Wattmeter, and Model 341 A.C. and D.C. Voltmeter.

The characteristics of the group are extreme accuracy (guaranteed within one-fourth of 1% of full scale value) adaptability for use on circuits of any commercial frequency and any wave form, great overload capacity, low moment of inertia, effective damping and shielding, and the legibility and remarkable uniformity of the hand-calibrated scales.

## Obvious Superiority!

While it is a fact generally recognized and admitted wherever the science of electrical measurement is known and practiced throughout the world today that

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ELECTRICAL

## Indicating Instruments

are in a distinctive and exclusive class, based upon their efficiency and acknowledged excellence, the actual use of the instruments themselves will demonstrate their superiority so conclusively that only one decision will be consistent after you have made comparisons.

Weston Indicating Instruments include a great variety of groups for portable or switchboard service on A.C. or D.C. Circuits. Instruments designed expressly for testing and laboratory use, for motor car and boat electrical systems, and many others for special purposes. Write for Bulletins or Catalogs describing those which interest you.

### Weston Electrical Instrument Company 21 Weston Ave., Newark, N. J.

New York	San Francisco	New Orleans	Vancouver	Rio de Janeiro
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Philadelphia	Cincinnati	Seattle	Florence, Italy	Santiago, Chile
Boston	Pittsburgh	Toronto	London	Buenos Aires
Cleveland	Richmond	Montreal	Copenhagen	Havana
Detroit	Buffalo	Halifax	Johannesburg, S. A.	Batavia, Dutch
St. Louis	Minneapolis	Winnipeg	Mexico City	East Indies

### Announcing Our New Product

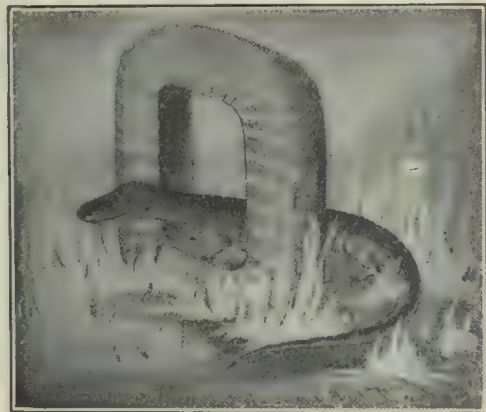
## Enamel Magnet Wire

TO those interested in Enamel Magnet Wire we beg to announce our new line of Enamel Magnet Wire, either plain, or with silk or cotton covering.

We invite correspondence, and will send samples and prices on request.

### Independent Lamp & Wire Co., Inc.

OFFICES: 1737 Broadway, New York  
 FACTORIES: York, Pa., and Weehawken, N. J.



### Get those coils back into service—quick!

Don't let LABOR SHORTAGE hold them up in your coil department. You can't get more men—but you can save time and money by sending the coils to us for re-insulation with

## SALAMANDER Pure Asbestos

We will return them promptly—better insulated and more durable than when new.

"Salamander" asbestos wire excels in insulating value and cannot burn out under the severest overload.

Leading electric railways are our best customers.

Write us for details now

### Independent Lamp & Wire Co., Inc.

OFFICES: 1737 Broadway, New York  
 FACTORIES: York, Pa., and Weehawken, N. J.



## WHAT AND WHERE TO BUY

**Drills, Track**

American Steel & Wire Co.  
Chicago Pneumatic Tool Co.  
Electric Service Supplies Co.  
Niles-Bement-Pond Co.  
Ohio Brass Co.

**Dryers, Sand**

Electric Service Supplies Co.  
Zellicker Supply Co., Walter A.  
Inc.

**Electrical Wires and Cables**

Roebbling's Sons Co., J. A.

**Engineers, Consulting, Contracting and Operating**

Archbold-Brady Co.  
Arnold Co., The  
Bylesby Co., Inc., H. M.  
Drum & Co., A. L.  
Ford, Bacon & Davis  
Holst, Englehardt W.  
Republic Engineers, Inc.  
Richey, Albert S.  
Sanderson & Porter.  
Scofield Engineering Co.  
Stone & Webster.  
White Companies, The J. G.  
Woodmansee & Davidson Engineering Co.

**Engines, Gas and Oil**

Westinghouse Elec. & Mfg. Co

**Engines, Steam**

Westinghouse Elec. & Mfg. Co.

**Fare Boxes**

Brill Co., The J. G.  
International Register Co., The  
National Railway Appliance Co.

**Fences, Woven Wire and Fence Posts**

American Steel & Wire Co.  
Page Steel & Wire Co.

**Fenders and Wheel Guards**

Brill Co., The J. G.  
Electric Service Supplies Co.  
Star Brass Works.

**Fibre and Fibre Tubing**

Johns-Manville Co., H. W.  
Westinghouse Elec. & Mfg. Co.

**Field Coils. (See Coils)****Filters, Water**

Scaife & Sons Co., Wm. B.

**Fire Extinguishing Apparatus**

Johns-Manville Co., H. W.

**Fire Proofing Material**

Johns-Manville Co., H. W.

**Floodlights**

Electric Service Supplies Co.

**Flooring Composition**

American Mason Safety Tread Co.

**Forgings**

Eureka Co.  
Standard Steel Works Co.  
Williams & Co., J. H.

**Frogs, Track. (See Track Work)****Furnaces. (See Stokers)****Fuses and Fuse Boxes**

Columbia M. W. & M. I. Co.  
D & W Fuse Co.  
General Electric Co.  
Johns-Manville Co., H. W.  
Westinghouse Elec. & Mfg. Co.

**Fuses, Refillable**

Columbia M. W. & M. I. Co.  
General Electric Co.

**Galvanizing**

Cattle, Jos. P. & Bros.

**Gaskets**

Johns-Manville Co., H. W.  
Power Specialty Co.  
Westinghouse Traction Brake Co.

**Gas Producers**

Westinghouse Elec. & Mfg. Co.

**Gates, Car**

Brill Co., The J. G.

**Gages, Oil and Water**

Ohio Brass Co.

**Gear Blanks**

Carnegie Steel Co.  
Standard Steel Works Co.

**Gear Cases**

Columbia M. W. & M. I. Co.  
Electric Service Supplies Co.  
Kerschner Co. Inc., W. R.  
Westinghouse Elec. & Mfg. Co.

**Gears and Pinions**

Columbia M. W. & M. I. Co.  
Electric Service Supplies Co.  
Kerschner Co., Inc., W. R.  
National Railway Appliance Co.  
Nuttall Co., R. D.

**Generating Sets, Gas-Electric**

General Electric Co.

**Generators**

General Electric Co.  
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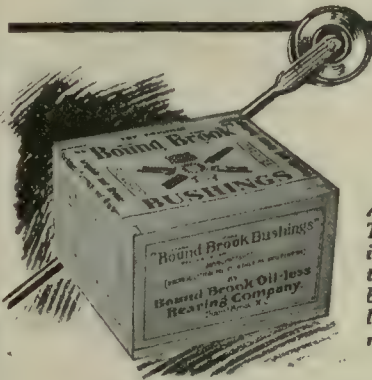
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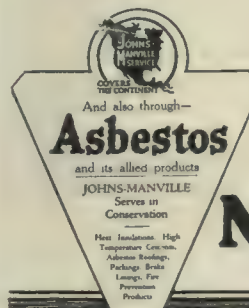
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— A cartridge strong enough to withstand shock after shock without damage.

H. W. JOHNS-MANVILLE CO.

New York City

10 Factories—Branches in 63 Large Cities



# JOHNS-MANVILLE



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## UNIVERSAL ANTI-SLIP TREADS

cars and station steps.

**Universal Safety Tread Company**  
Waltham, Mass.

## VAN DORN COUPLERS

are made for every condition and requirement. M.C.  
B. Pin and Link, Car and Air, in all sizes and types.

**VAN DORN COUPLER CO.**

2325 So. Paulina St., Chicago, Ill.

## Eight Hundred and Twenty-three Equipments of N L Indicating Tail-lights Sold During the Year 1918

2323 Cars now equipped and the motormen in Cleveland, Toledo, Philadelphia, Akron and St. Joseph say it is the best thing ever put on a car to promote safety and economy.

**THE NICHOLS-LINTERN COMPANY, Cleveland, Ohio, U. S. A.**

The Most Successful Men in the Electric Railway Industry read the

**ELECTRIC RAILWAY JOURNAL**

Every Week



## Samson Bell and Register Cord

Solid braided cotton, extra quality. All sizes and colors. More durable, more economical and better looking than leather or rawhide. Send for samples and full information.

**SAMSON CORDAGE WORKS, BOSTON, MASS.**

## A Single Segment or a Complete Commutator

is turned out with equal care in our shops. The orders we fill differ only in magnitude: small orders command our utmost care and skill just as do large orders. CAMERON quality applies to every coil or segment that we make, as well as to every commutator we build. That's why so many electric railway men rely absolutely on our name.

**Cameron Electrical Mfg. Co., Ansonia, Connecticut**





# Here is the New Columbia Foundry



## Anything in the Line of Castings

**G**REY Iron, Semi-Steel—Bronze Composition. We will make any casting you desire—and make it *well*. Whether it's a 6000-lb. cast-iron base plate for a machine tool or the smallest detail that can be poured, you are assured of a high-grade product. Columbia foundry facilities are now equal to any demand.

## Columbia Machine Works & Malleable Iron Co.

Atlantic Ave. and Chestnut St.

Brooklyn, N. Y.

### TOOLS

Armature and Axle Straighteners  
Armature shaft straighteners  
Armature buggies and stands  
Babbling molds  
Bending and heading machines  
Car-hoists  
Car replacers  
Coil Taping machines for armature leads  
Coil winding machines  
Pinion pullers  
Pit jacks  
Signal or target switches  
Tension stands

W. R. Kerschner Co., Inc., N. Y.  
Holden & White, Inc., Chicago  
F. F. Bodler, San Francisco  
Railway & Power Eng. Co., Ltd., Toronto, Ont.



### CAR EQUIPMENT

Armature and axle bearings  
Armature and field coils  
Bearings (axle and armature)  
Brush-holders and brush-holder springs  
Brake, door and other handles  
Brake forgings, riggings, etc.  
Car trimmings  
Commutators  
Controller handles  
Forgings of all kinds  
Gear cases (steel or malleable iron)  
Grid resistors  
Third-rail shoe beams and accessories  
Trolley poles (steel) and wheels





## Dividing the Cost

Advertising contractors of limited scope simply cannot afford to give to car card advertisers a service that makes this advertising a source of *permanent* income to railway companies.

Only the nation-wide magnitude of the Collier organization makes it feasible to incur the large expenditures necessary to develop the car card ideas which create satisfied advertisers.

Thus only the great organization developed by Collier Service makes it possible to assure electric railways an unfailing income from car card advertising.

**Barron G. Collier**  
INCORPORATED

Candler Building

220 West 42nd Street, New York City





# The Birney Safety Car Truck

"Have you noticed the combination of springs on the ends of this truck and how smoothly it makes the car ride?"

"I certainly have! And have you noticed that these cars never see-saw like other four-wheelers? It's a bully truck and a credit to a bully car!"

If you should ask Mr. Birney to enumerate the principal reasons why the Birney Safety Car has proved such a splendid success, he probably would not get very far down the list before he'd tell you of the importance of the easy riding truck.

Naturally, Mr. Birney would be extremely critical regarding the performance of the truck this car is carried on, and Mr. Birney emphatically says that the Birney Safety Car Truck is the best single-truck ever built.

The elimination of oscillation, or see-sawing, is accom-

plished by placing 75 per cent. of the load on springs at the extreme ends of the truck.

You can readily understand how steady the motion must be when you know that the centers of the spiral end springs are 12 feet apart—24 inches beyond the axle center—the wheel base being 8 feet.

Then the fact that the body rests on a cushion of six resilient spirals, and that the large diameter end spirals are link-suspended from the ends of quarter-elliptics, makes a perfect shock and vibration absorbing arrangement.

*Bulletin 234 will tell you about the side-easement and other features of the Birney Safety Car Truck, otherwise known as the Brill 78-M type.*

THE J. G. BRILL COMPANY  
PHILADELPHIA, PA.

G. C. KUHLMAN CAR CO.  
CLEVELAND, OHIO



AMERICAN CAR COMPANY  
ST. LOUIS, MO.

WASON MANUFACTURING CO.  
SPRINGFIELD, MASS.





## A substation with the latest types of equipment

The three synchronous converters in the Tonawanda substation of the International Railway Company of Rochester, N. Y., are the latest types of General Electric high speed 25 cycle machines. The remainder of the substation equipment, consisting of transformers and switchboards, was also manufactured by this company.

# GENERAL ELECTRIC COMPANY



# ELECTRIC RAILWAY JOURNAL



## Samson Spot Trolley Cord

insures reliable service from Catchers and Retrievers without regard to rain or snow. Waterproof—non-swelling—smooth—durable. The Colored Spots identify it.

## Samson Register and Signal Cords

defy the wear of rough, sharp, cord supports.

*Send for Catalog and Samples.*

**SAMSON CORDAGE WORKS**  
BOSTON, MASS.





No. 506 Motor  
Showing Ball Bearings

**No. 506 Motors**  
with either  
Ball or Sleeve Armature Bearings  
for



No. 506 Motor  
Showing Sleeve Bearings

## **Safety Cars**

### **Safety Car Facts:**

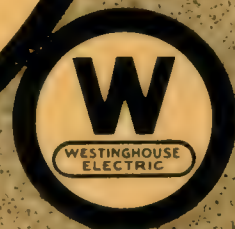
Quotation from the manager of a road largely equipped  
with Safety Cars:

"The Birney Car has saved the situation."

And from other users:

"It has changed the returns of operation from  
a loss to a profit."

Westinghouse Electric & Manufacturing Co.  
East Pittsburgh, Pa.



# **Westinghouse**



# Electric Railway Journal

H. W. BLAKE, *Editor*

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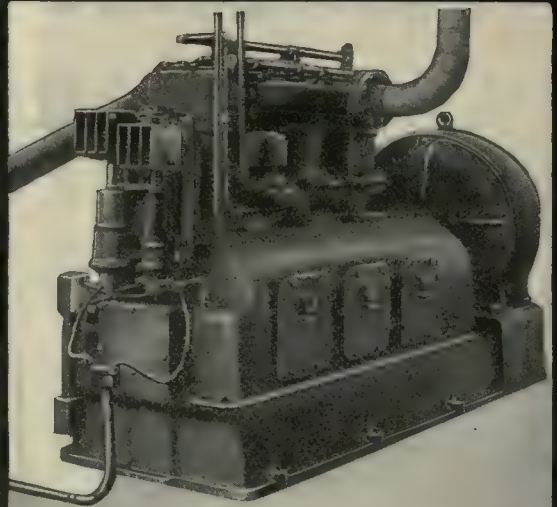
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## Air Compressors for Shop Uses



Westinghouse Motor-Driven Air  
Compressor with automatic gov-  
ernor. All sizes up to 550 cu. ft.  
Catalog No. 401.

Compressed Air is a convenient, cleanly  
agent always on tap for railway shop uses.

## Westinghouse Electrically-Driven Compressors

are especially adapted to bench and machine  
use for supplying pressure to blow chips and  
cuttings; also for pneumatic tools and hoists.

## Westinghouse Traction Brake Company

General Offices and Works, Wilmerding, Pa.

Atlanta, Ga.  
Boston, Mass.  
Chicago, Ill.  
Columbus, O

Denver, Col.  
Houston, Tex.  
Los Angeles, Cal.



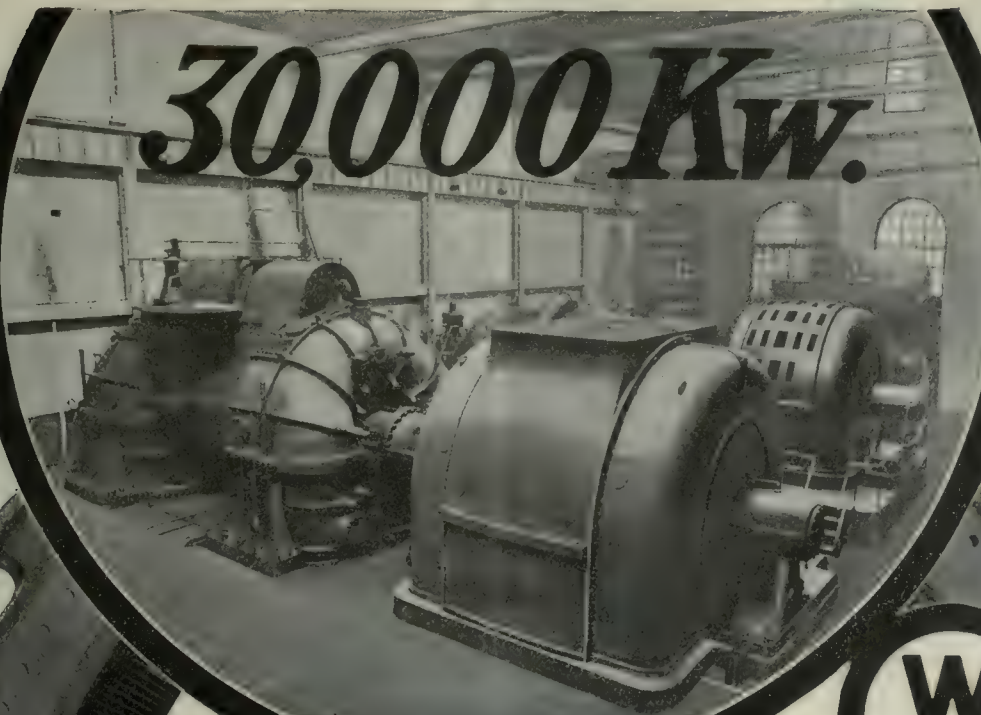
Mexico City  
New York, N. Y.  
Pittsburgh, Pa.

San Francisco.  
Seattle, Wash.  
St. Louis, Mo.  
St. Paul, Minn.



# *Reliability*

**30,000 Kw.**

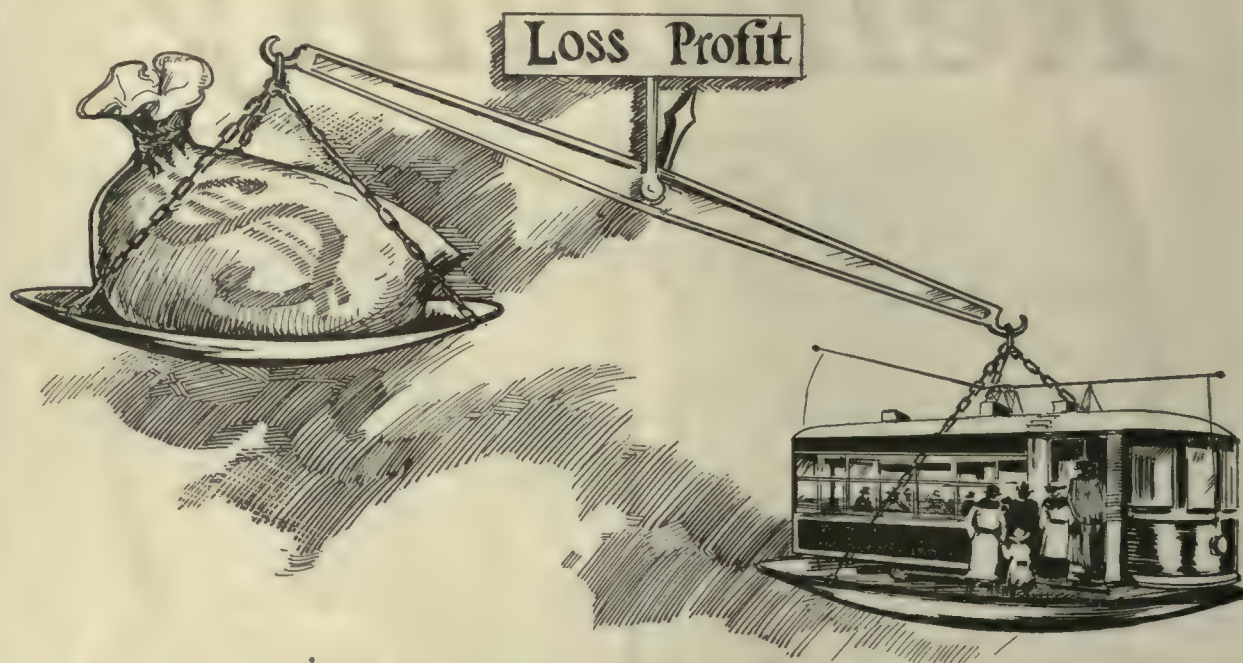


The successful operation of our  
30,000 - kw. Single - Cylinder  
Turbine-Generators has proved  
both the high efficiency and  
the reliability of this design.

Westinghouse Electric & Mfg. Co.  
East Pittsburgh, Pa.

# Westinghouse





## The Safety Car Is Profitable

When you raise your fare to 6, 7 or 8 cents, you don't know whether your earnings will increase or not.

In fact, both riding and schedule speed are likely to *decrease* with a consequent *increase* in operating expenses.

But when you install Safety Car Control Equipments with shorter-headway service, you have the experience of many users to assure you,

That platform expenses will go *down* 30 to 40 per cent.

That power expenses will go *down* 40 to 50 per cent.

That income from travel will go *up* 25 to 60 per cent.

Your stockholders will surely approve any expenditures you suggest for equipment that can produce such results as these.

## SAFETY CAR DEVICES CO.

Main Office—Boatmen's Bank Bldg., ST. LOUIS, MO.

CHICAGO

NEW YORK

PITTSBURGH

Railway Exchange Bldg.

City Invest. Building.

Westinghouse Building

CANADA—Canadian Westinghouse Co., Ltd., Hamilton, Ont.





# PRODUCTS

*Quality First*



O-B Type E Live Adjustable Cross-over. Form 1 with deflector bars—30° to 60° angles. Form 2—same as Form 1 except deflector bars removed—60° to 90° angles.



O-B Type F Insulated Adjustable Cross-over 45° to 90° angles.

## Job Done Well and Quickly with O-B Adjustable Crossovers

Whether the line work is done in traffic where every second counts or at night when darkness demands simplicity O-B Crossovers are invaluable.

The two runways are interlocked—no screws or bolts—and are pulled apart at the proper angle.

The trolley wire is laid in place without cutting. The cam tips slip in place as shown in the illustrations at the bottom.

It is so easy to install O-B Crossovers that there is no temptation to leave the job half done.

Their sturdy, rust-proof construction and their smooth-running, well-designed pans assure long life and satisfaction.

## The Ohio Brass Company, Mansfield, Ohio

New York

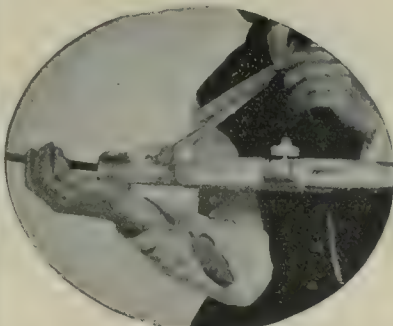
Philadelphia

Pittsburgh

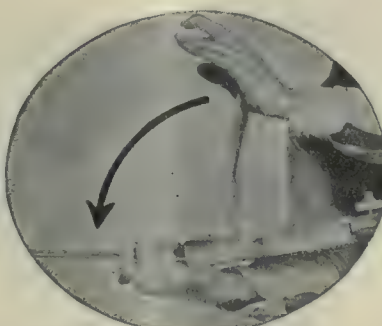
Chicago

Los Angeles

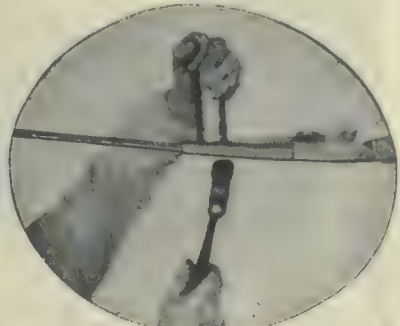
San Francisco



Slip tip under hooks—



turn over and down on the wire—



clinch the lips and the job is done.



# The ELRECO Tubular Pole the Pole of Least Maintenance and Replacement

THE cylindrical form of Elreco Tubular Poles, which makes them lowest in first cost, also makes them lowest in maintenance cost.

The committee on Power Distribution of A. E. R. A., after a thorough investigation, recommended the use of the Tubular Steel Pole. This is the only form of steel pole ever recommended by this committee. The record of simplicity, ease of handling, reliability and durability of Elreco Poles over a period of twenty-five years was reflected in this recommendation.

All steel products must necessarily be protected from corrosion. This is true of steel poles, and time has

proved that Tubular Steel Poles are the least affected by action of the air and moisture and are most accessible for painting.

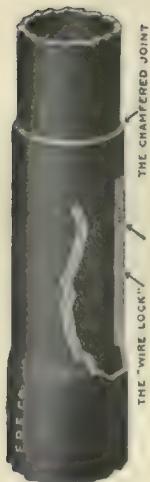
Elreco Poles have no angles or pockets to retain moisture, and no corners that are accessible to corrosion. Therefore, they are less subject to the ill effect of corrosion than are structural steel poles. Owing to the tubular shape any Elreco Pole can be furnished with protecting sleeve, which provides double thickness of metal at the ground line.

It is evident that the pole least susceptible to corrosion will give the longest life—the ELRECO has that record.



Capitol Street  
Charleston, W. Va.

Elreco Tubular Poles  
Combine  
Lowest Cost  
Lightest Weight  
Least Maintenance  
Greatest Adaptability



## Electric Railway Equipment Co.

Cincinnati, Ohio

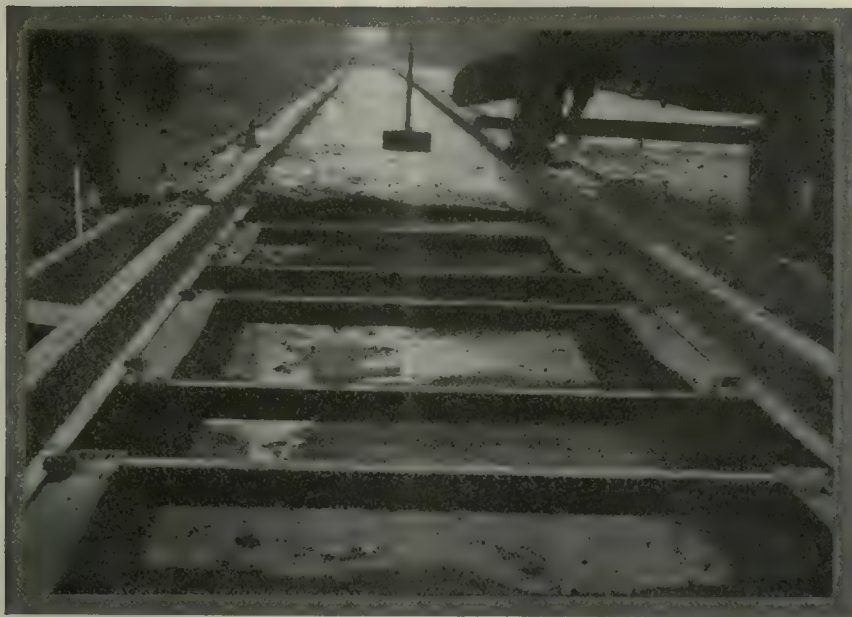
New York: 30 Church Street



# INTERNATIONAL

## STEEL TWIN TIES

Give a Better Rail Foundation with Less  
Excavation and Material



How much concrete do you plan to use beneath the base of the rail?

Twelve inches? Fourteen inches? *Or seven inches?*

International Steel Twin Tie construction makes it possible to use only *seven* inches.

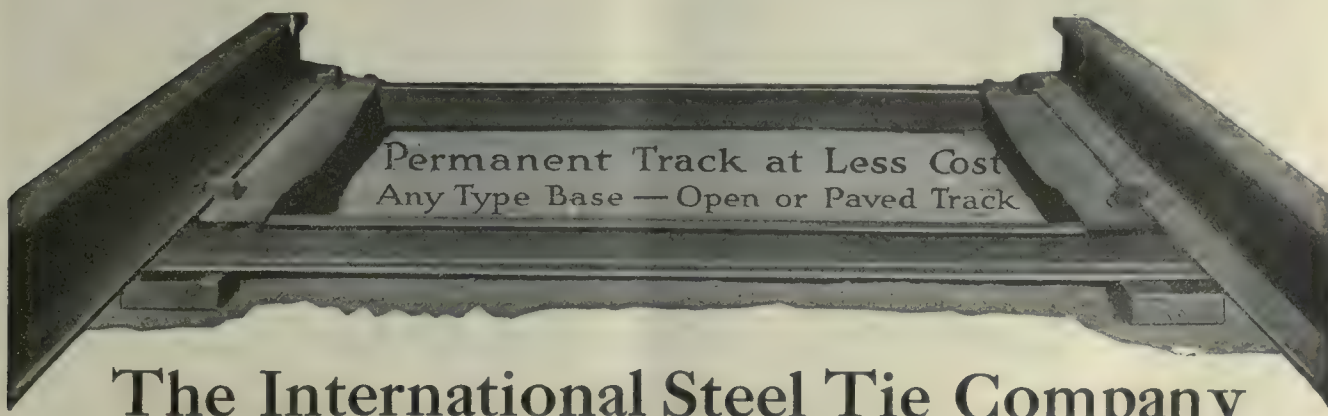
Contrast this with the 12 to 14 inches needed by wooden ties.

Contrast the difference in *trench* dimensions. Wood ties, trench 8 to 9 ft. wide. Steel Twin Ties—7 ft. Less

labor—less material—less time—less COST with Steel Twin Ties.

And a *better track foundation*—because, in spite of the fact that you use only 7 inches of concrete, the steel used so *reinforces* it that it is rendered 100 per cent. substantial, loads are evenly distributed by the plates, and yet a *resiliency* remains that reduces wear all around. Steel Twin Ties are constructed of two 13 x 36 x  $\frac{5}{16}$ -inch plates, tied together by 3-in. channels.

*Ask us for details of all the economies secured by using these ties.*



# The International Steel Tie Company

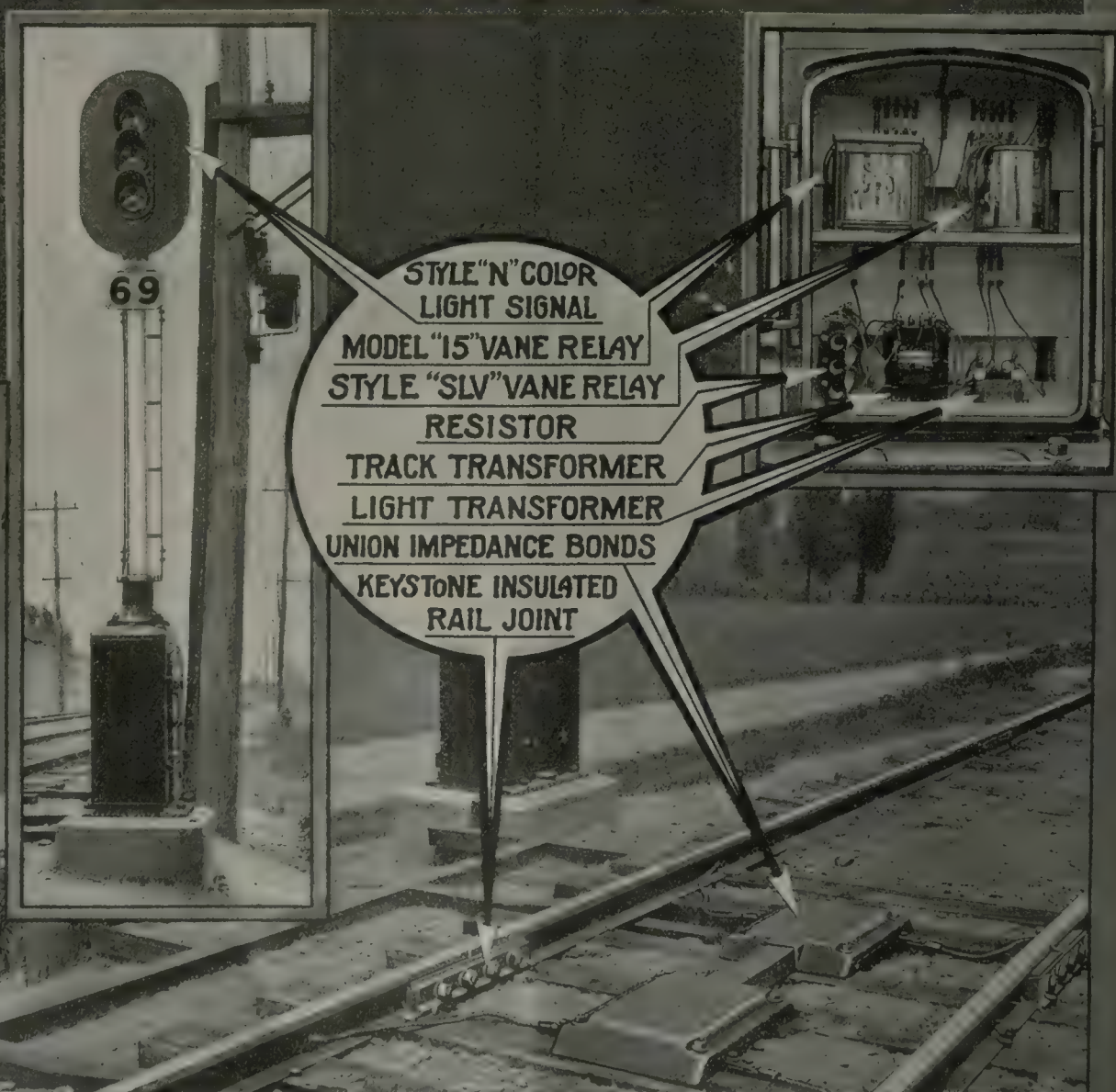
Manufacturers of Steel Twin Ties and Crossing Foundations

General Sales Office and Works: Cleveland, Ohio



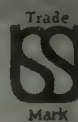
# STYLE "N" COLOR LIGHT SIGNALS

UNION equipment will solve *your* interurban traffic problems. Let us study your operating conditions and cooperate with you in considering what *automatic block signaling* will do for *your* line.



## Union Switch & Signal Co.

SWISSVALE, PA.





## Still More Fine Cars Equipped, Inside and Out, With Keystone Specialties

The Southern Pennsylvania Traction Co. are using this standard Keystone Equipment on their cars:

**"Golden Glow" Incandescent Headlights.**

**"Safety" Car Lighting Fixtures.**

**Keystone Trolley Catchers.**

**Keystone Motormen's Seats.**

**Keystone Car Signs.**



*Inside view showing Keystone  
Motorman's Seat*



*General view of car operated by the Southern  
Pennsylvania Traction Co.*

They realize fully the greatly increased efficiency in operation which this equipment provides. Their "Golden Glow" Headlights, Keystone Car Signs and "Safety" Lighting Fixtures give these cars distinction, make them attractive and pleasurable to ride in at night. Their Keystone Trolley Catchers keep the poles from "banging" the overhead construction. Their Keystone Motormen's Seats make easy jobs out of hard jobs—contented motormen is the result.

Make YOUR cars efficient and you can expect better returns. Always use Keystone Specialties. *Write for data sheets.*

# ELECTRIC SERVICE SUPPLIES Co.

*Manufacturer of Railway Material and Electrical Supplies*

PHILADELPHIA      PITTSBURGH      NEW YORK      CHICAGO  
17th and Cambria Streets   337 Oliver Building   50 Church Street   Monadnock Building  
Canadian Distributors: Lyman Tube & Supply Co., Montreal, Toronto, Winnipeg.



# Replace Your Worn Center Bearings with Hartman

Raceways  
That Don't Pit

Increase Life  
of Wheels

Will Fit Almost  
Any Truck

Are Self-  
Centering

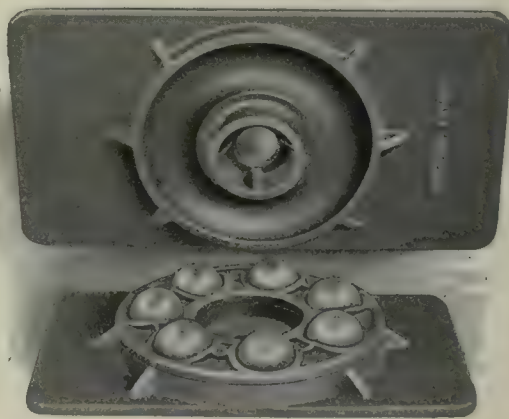
No Lubrication  
Needed

Send for dimension sheets and Catalogue No. 10. We can tell from the former how to supply you with proper bearings for ready application.

Undoubtedly you have cars with worn center bearings—either plain or anti-friction. Why not try out some Hartman self-centering plates on these cars?

You will find that they about double the life of wheels, cutting in half the cost of renewals and removals for grinding. They reduce truck nosing and decrease power consumption on curves. The shape of the raceways prevents pitting and the balls are  $2\frac{1}{8}$  inches in diameter, made of forged steel.

Combined with Perry anti-friction side bearings they give you ideal truck operation. Or they can be used with ordinary friction side plates.



PUT THEM ON YOUR OLD CARS

## Holden & White Inc.

Electric Railway Distributors for The Joliet Railway Supply Company

817 Fisher Bldg., Chicago

National Rwy. Appliance Co., New York. Washington: W. M. McClintock. St. Paul: Alfred Connor. Denver: C. E. A. Carr. Toronto: F. F. Bodler. San Francisco: S. I. Wailes. Los Angeles: W. F. McKenney. Portland: L. Brandenburger. Salt Lake City.



## For Electric Railway Service Rome Wires Are Always In Demand

**B**ECAUSE of their uniform quality and the durability of their service.

Quality governs their manufacture throughout every operation yet the price of Rome Wires is always kept moderate because of superior methods, machinery and management.

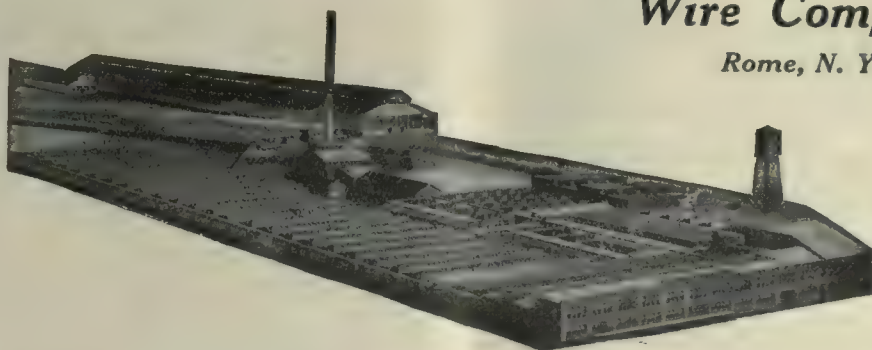
Our 19 years' experience must have taught us how to make Rome Wires and Cables Right—and not only has it taught us how to make wires and cables but it has taught us the real meaning of the word Service.

The inquirer into Rome Products gets into immediate touch with an executive of the organization—an order receives this same executive attention—the delivery promise and fulfillment are also overseen by this authoritative supervision. No wonder Rome Service has been such an impetus to Rome Products.

Your jobber can supply you. Tell him your requirements.

**Rome  
Wire Company**

*Rome, N. Y.*



**All Operations from Wire Bar to Finished Product in this Plant.**

Hot Rolled Copper and Bronze Rods.  
Copper and Bronze Bare Wire,  
Round, Square and Rectangular,  
Plain and Tinned.

Copper and Bronze Trolley Wire,  
Round, Grooved and Figure 8.

Copper and Bronze Power Cables,  
Solid and Stranded.

Round Edge Flat Copper Strip.  
Polished Copper Piano Covering  
Wire.

Magnet Wire.  
Round, Square and Rectangular.

Rubber Insulated Wires.  
Automobile Wires.

Miscellaneous Wires.

Brewery Cord.  
Canvasite Cord.  
Deck Cable.  
Gas Engine Cable.  
Mining Machine Cables.  
Gathering Locomotive Cables.  
Special Wires and Cables.  
Wires and Cables for Export.



# Phono-Electric

## For Curves and Crossings



The Houston Electric Company has some 4 miles of No. 00 Phono-Electric Trolley Wire which it is installing as the No. 0000 copper wears out on its main belt—especially at curves and crossings.

By employing No. 00 Phono-Electric the company will be using the same gage as it does on its other lines.

Thus there will be no need to continue indefinitely the use of different splicers and other overhead parts.

In other words, the reduced longevity of copper in heavy service can be overcome by using the standard wire gage Phono-Electric.

And No. 00 Phono-Electric costs less than No. 0000 copper.

**Bridgeport Brass Company**  
**Bridgeport** **Connecticut**



# The Thermit Process of Track Welding

Makes Permanent Joints

Costs Less in the End



The Thermit Process is the only method of rail welding which solves the problem by eliminating the joint, making a perfect weld between the rail heads. This method is much superior, both mechanically and electrically, to any other kind of joint. It makes a permanent union, which will last as long or longer than the rails proper. It has an electrical conductivity equal to the rail itself. Failure of a joint to conduct ALL the electricity to the power house means loss of energy, electrolysis and interference with nearby low voltage circuits.

Our Catalog No. 12, free on request, describes the Thermit insert rail weld and shows why this process is not only the best solution of the rail joint problem, but is also the least expensive method in the end, making due allowance for all considerations entering into track welding.

*May we send you this catalog, or better still,  
may we discuss track welding with you?*

## METAL & THERMIT CORPORATION

Successors to Goldschmidt Detinning Co. and the Goldschmidt Thermit Co.

120 BROADWAY, NEW YORK

329-333 Folsom St., San Francisco

7300 So. Chicago Ave., Chicago

Factories located at Chrome, N. J.; Wyandotte, Mich.; East Chicago, Ind.; Jersey City, N. J.

15 Emily St., W. Toronto, Ont.

1427-1429 Western Ave., Pittsburgh, Pa.



# Here's Information You Need!

In view of the modern trend toward welding as a means of labor, time and money saving, and the positive superiority of **ARMCO IRON** filling material, every well posted welding engineer should have this book of valuable information at hand for quick reference.

"Armco Iron Welding Rods and Wire" is not merely a catalog, but treats in a helpful way of the following subjects:

*Requisites of a desirable filling material.*

*Welding of mild steel and wrought iron.*

*How and why the new American product ARMCO IRON surpasses the now unobtainable genuine Norway and Swedish irons as a welding material.*

*How a single composition of ARMCO IRON supplants a large number of compositions of other welding materials.*

*Analysis and physical tests of ARMCO IRON.*

*Typical examples and illustrations of welding done with ARMCO IRON.*

*Emergency Fleet Corporation specifications for welding wire.*

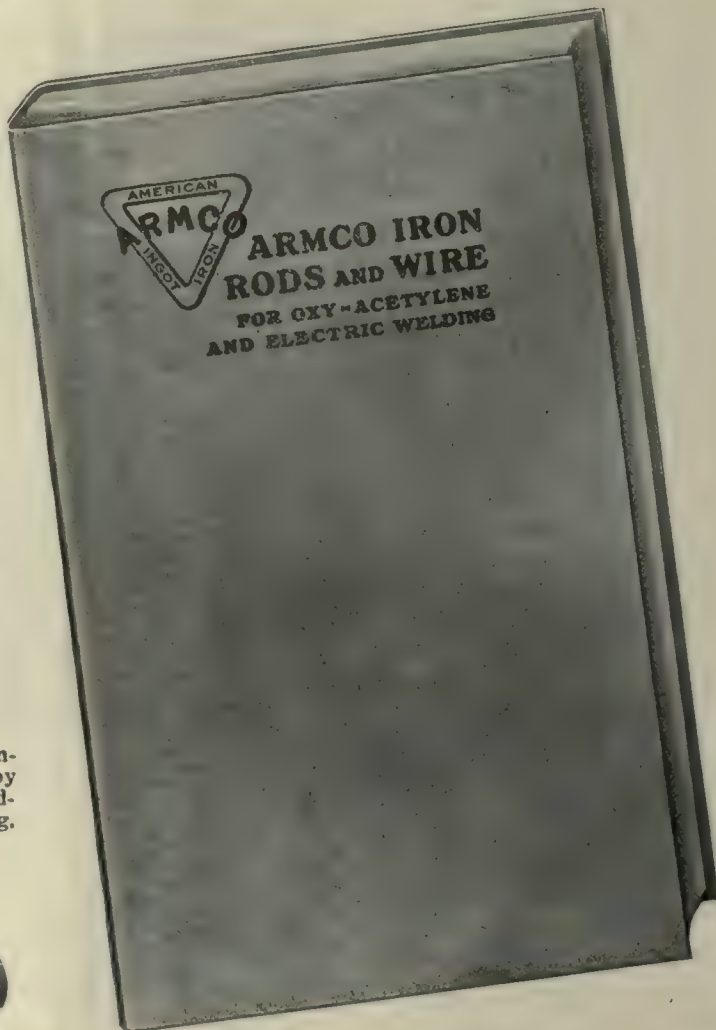
*Microscopic study of steel and iron with reference to welding.*

*Cost cards for keeping tab on welding jobs.*

*Metallurgy of iron and steel, including color chart for heat treatment.*

*Miscellaneous useful data including tables of wire gauges, conversion of temperatures from Fahrenheit to Centigrade, properties of elements and metal compositions, decimal equivalents, metric conversion tables, definitions of electrical units, mensuration factors.*

If you are a consulting, designing or managing engineer, shop superintendent or foreman, your free copy is ready for mailing on request, and the engineering advice of our welding specialists is also free for the asking.



## PAGE STEEL & WIRE CO.

*Established 1883 as Page Woven Wire Fence Co.*

Makers of "Copperweld" Copper Clad Steel Wire; ARMCO Iron Welding Rods and Electrical Wire; Wire Mill Products, Plain and Galvanized; Wire of Special Analysis; Wire Fencing for all Purposes; Factory Gates; Ornamental Iron Fence; Machine Guards; Tool and Stockroom Partitions; Architectural Iron.

*Plants: Monessen, Pa. and Adrian, Mich.*

**Sales Offices: 30 Church Street, New York**

Western Representatives: Steel Sales Corporation, Chicago

Canadian Distributors: Taylor & Arnold, Montreal and Winnipeg.





Differences in height of rails at joints must be removed immediately to conserve the life of the joint. Practice has demonstrated this very forcibly within the last eight years, and I will mention one particular instance out of many where the issue was brought to my attention. Two pairs of compromise splices were installed of the Atlas type where 70-lb. A. S. C. E. rails were connected to 97-lb. 424 grooved section. At this time of installation in 1913 a very slight difference in the surface of the rails was noticed, and we neglected to grind the rails to a smooth surface. This was a single track over which 26-ton cars operated on a headway of from three to four minutes. *Inside of eight months these joints were a wreck, including paving and rail ends.* In order to repair them, new Atlas plates were installed, new pieces of rails were cut in, *and the joints were then ground to a true surface.* After more than two years these joints are apparently as perfect as on the day they were installed. We find this to be particularly true on compromise joints at special work.

*From a report of the track superintendent of a large electric railway*

## The Proven Case

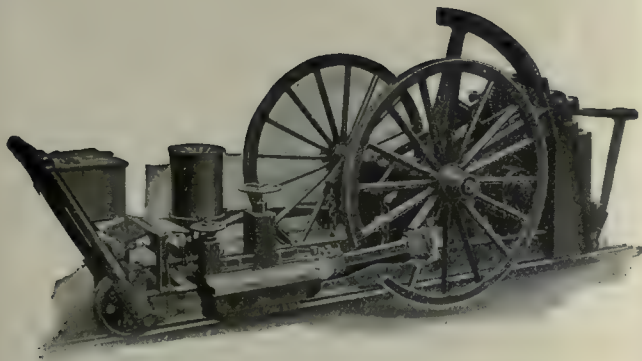
# The Reciprocating Track Grinder

has *proven* its value to the electric railway industry.

That proof has been given in such cases as the one cited above. It has been given in cases where stretches of track were in such bad condition from corrugations and cupped joints that replacement seemed the only remedy and the Reciprocating Grinder restored the rail to useful service. It has been given in cases where other types of machines had been tried and found unsatisfactory.

And this proof has been given just as it is given today—by the actual performance of the machine in service—by putting the machine on the track and letting its work furnish the evidence of its value.

We will gladly put a Reciprocating Grinder on your track to prove its worth to you, without any risk on your part.



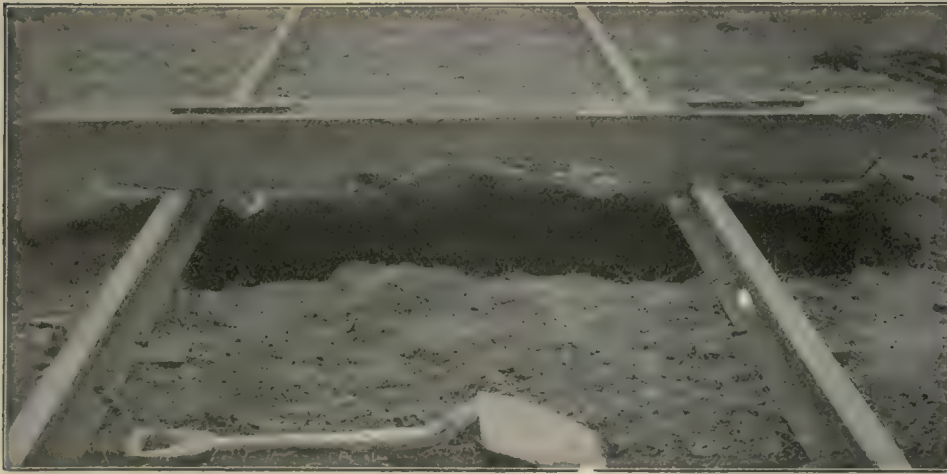
## RAILWAY TRACK-WORK COMPANY

30th and Walnut Streets, Philadelphia





# This Comparison can hardly be used too often—

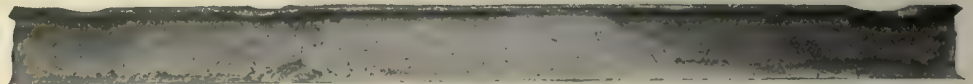


**Modeled in  
Concrete—**

**Pounded by heavy  
high speed traffic  
for 6 years—**

**Good as New!**

**6-inch steel 5 years  
under low speed traffic**



The mechanical tie here shown was placed in the tracks of the Dayton, Springfield & Xenia Southern Railway at a point where it would be subjected to the most severe use. Heavy cars at high speed have hammered this tie for seven years. Its condition shows plainly—it's as good as when it was installed.

The 6-in. steel I-beam was in use for Five Years under a cross-over near a railroad crossing, where all cars run at reduced speed. It is merely one of a number similarly dented and hammered. Just study the pictures and—THINK.



*Then write us for further details*

**THE DAYTON MECHANICAL TIE CO.**

201 Third Street Arcade  
DAYTON, OHIO





# The United Railways and Electric Co. of BALTIMORE *has just ordered*

# 13000

## Arthur Power Saving Recorders

for use on both air-brake and hand-brake cars. In line with the same reasons which impelled other roads to choose the Arthur method, this property weighed the fact that since the Arthur Recorder costs comparatively little and saves a great deal, it would pay for itself sooner than any other type. Figures indicate that it will pay for itself on this property in three months or less.

Does not the reasoning of the four important properties listed herein point your way?

Remember, we are not citing "trial installations" of a few devices. We point to substantial orders for equipping entire roads. Such orders are placed only after careful investigation.

You can well afford to follow these examples, but you can NOT afford to overlook them. See next page.

**The Arthur  
Power Saving Recorder Co.**  
New Haven, Conn.



"It talks the language of the motorman"



# The Connecticut Company

*ordered*

# 1400

## Arthur Power Saving Recorders

more than a year ago. The device has thoroughly demonstrated its worth on this property. The saving in coal resulting from the power-saving campaign of this Company amounts to 20% for the entire property. In addition, the effect of the recorder on safety of operation and maintenance of equipment has been most beneficial, and these features in themselves have more than justified the selection of the Arthur Recorder.



"It talks the language of the motorman"

These examples alone should demonstrate the importance of making the Arthur Recorder your own choice. But there is yet other evidence. For example, see next page.

## The Arthur Power

Second National Bank

*You don't have to buy Arthur Recorders. If desired, we rent them on easy terms—just a few cents per day—and allow the full amount of the rental*



# The Springfield Street Railway Co. (Mass.)

*has purchased*

# 225

## Arthur Power Saving Recorders

to equip its entire property. The officers of this company realized the importance of choosing a device that "talks to the motorman in his own language" by recording the minutes that power is on. Telling the motorman how many minutes he has power on encourages him to shut it off. It teaches him how and when to apply power to get the most mileage with the least power. It directly helps him operate safely by directly inducing him to shut the power off at every opportunity.

These important installations surely show that the Arthur Recorder is your logical choice. If these are not enough then further note that—see next page.

## Power Saving Recorder Co.

Building, New Haven, Conn.

*payments to apply on the purchase price. The instruments therefore automatically become yours after a certain time—about a year or so.*

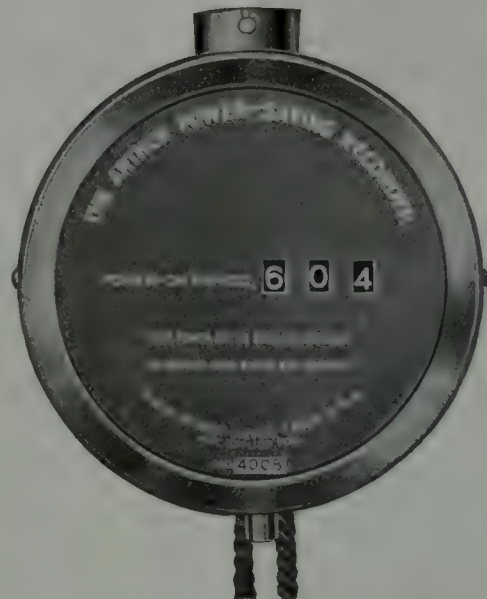


"He can check it with his own watch"



# The Berkshire Street Railway Co.

with 100 cars, and several  
other smaller  
companies, have bought



"It talks the language of the Motorman"

## Arthur Power Saving Recorders for their entire properties

The officials and engineers of these properties investigated carefully. They saw the importance of choosing a device that the motorman could easily understand. What he understands he has confidence in and confidence begets cooperation. You can't get cooperation otherwise. He understands a device that simply records minutes. He can check it with his own watch.

They recognized, further, the advantage of a device that required but little clerical work to follow up the records and that provided figures which when desired could be used as a basis for car inspection without requiring a record of individual car mileages.

### HOW IT WORKS

By comparison of his figures with the records made by other men operating over the same route or in the same service, and by the posting up of all men's records at intervals, a spirit of friendly rivalry is established. The men soon learn to keep track of their own records on whatever basis has been agreed upon, i.e., so many minutes with power on per trip, per mile, per hour, or per day, and car operation is at once greatly improved. Registration of the result in "minutes" appeals to the motorman. He may not know exactly what a kilowatt-hour is; or even what a coasting percentage is—very few motormen do. But he does know and understand that if he is running his car with power on a shorter time than formerly, he is saving power. HE HAS FAITH ONLY IN WHAT HE UNDERSTANDS. This feature of the Arthur Recorder is important.

Once get the motorman to "start thinking" about how much he can run his car with power shut off and he soon learns to take advantage of every factor that will help his record—for instance:

- (1) By coasting whenever possible.
- (2) By not crowding too close to the car ahead.

- (3) By not fanning the brakes.
- (4) By not carelessly allowing the brakes to drag.
- (5) By not applying power and brakes at the same time on down grades.
- (6) By not running ahead of time, or leaving terminal or end of line late.
- (7) By not keeping power on so long as to produce unnecessarily high and possibly dangerous speeds.

It is obvious that by running with power shut off as much as possible, the car is held under better control and can be more quickly stopped in an emergency. *Many accidents are thereby avoided.*

THE NET EFFECT OF THE ABOVE FEATURES is to save power, decrease accidents, and increase the life of brake-shoes, wheels, and car equipment.

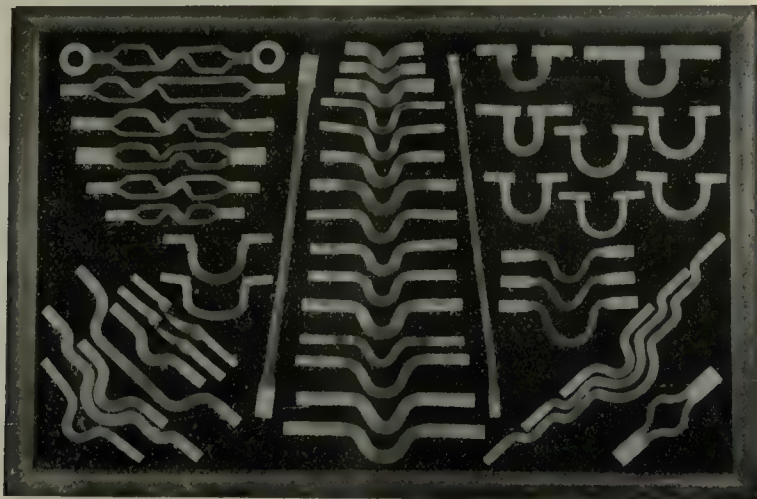
The Recorder being of exceedingly simple construction is inexpensive to purchase, install and maintain. It will pay for itself several times over in the first year.

*For further information write to*

## The Arthur Power Saving Recorder Co.

Second National Bank Building, New Haven, Conn.





# ERICO Rail Bonds

## have all the natural elasticity of New Copper Wire

The wire used in their manufacture is annealed before, not after, the bonds are made.

Erico bonds are manufactured cold—the copper is not heated in any way after it is taken from the reel. This eliminates all danger of frequent heating and overheating.

Erico bonds, properly welded, insure a permanent, low-resistance contact which will not depreciate through action of the elements.

They are the best possible investment in the task of getting your long neglected track back into that "85% new" condition deemed adequate by the valuation experts.

*Write for Prices and Descriptive Matter.*

**The Electric Railway Improvement Co.**  
Cleveland



Here is the way hundreds of roads  
are saving millions of dollars—

The  
Men  
May Be  
Unskilled



The  
Track  
May Be  
Old and Worn

Using the  
**Indianapolis Electric Welder**

to reclaim special work and—  
to apply Indianapolis Welded Joints

A few months over six years ago we introduced the first portable electric welder to the Electric Railway field. Today 90% of the important street railways are not only Indianapolis-equipped, but consider Electric Welding indispensable for operating maximum efficiency. Clearly a machine that was **NOT simple** to operate, **economical** to operate, easily portable and everlastingly adaptable and efficient could **NOT** make its way in this manner. The Indianapolis meets all these requirements. We have issued a 50-page booklet that will grasp the interest of those men who **need not be told of the vital necessity of reclaiming worn track and equipment.** Send for your copy.

*We Specialize in the Manufacture of*

**Solid Manganese Crossings  
Standardized Designs  
and Volume-Production**

*Attractive Prices. Get our figures for Either Estimates or Purchases.*

**Indianapolis Switch and Frog Company, Springfield, Ohio**





# Toncan Metal for Culverts

## —Because It Resists Rust—

Actual service under most trying conditions has proved that Toncan Metal will withstand the most corrosive influences. This is due, first to its purity—freedom from excess of those elements which promote corrosion. Second, to its uniformity—the same quality all the way thru. Third, to its extra heavy

galvanizing—an additional protection. Fourth to the rigid inspection it undergoes—each sheet must be perfect to pass

Toncan Metal has the wearing quality of that old time iron. Its cost per year for service is extremely low

*Whether the fill is shallow or extra deep there is a Toncan Metal Culvert to fit.*



*Great manufacturing facilities and numerous distributing points insure prompt service on small or large orders.*

Our immense sheet rolling plant with its 28 giant mills manned by specially trained, expert sheet metal rollers insures a constant supply to those culvert manufacturers of America privileged to use this rust-resisting, long-lived Toncan Metal. Write us about your culvert needs. Let us help you select the very best culvert obtainable for your purpose. Ask for special Toncan Metal Culvert Folder Q-21. It gives you all the information in a nut shell. Write today.

**THE STARK ROLLING MILL CO., Canton, Ohio**





# Prevent Insulation Troubles

OF INSULATION

The same trend is noticeable in other departments of the industry. It seems to us that this trend is decidedly in the right direction. Remedial medicine may help alleviate the pains of a sick man, but preventive medicine keeps him from getting sick and is therefore the most economical as well as the most logical.

Irvington Insulation Products are emphatically "preventative medicines"—and therefore most *economical* as well as most *logical*. They *prevent* insulation breakdowns, because of their high resistance, high dielectric strength, non-hygroscopic qualities, heat resistance and neutrality to chemical action. One of the best "preventatives" we offer is

## Irvington Black Varnished Cambric

But whether you wish to prevent or to remedy insulation ills on your road, there is an Irvington Product for your exact necessity. We make oiled silk, flexible varnished tubing, special paper

for coil winding, yellow varnished cambric. And the trend among the *experienced* is clearly toward their use in ever increasing quantities. Irvington Insulating Products meet the new standard now being set by the best electric rail-



ways—that of *public utility* rather than merely private interests. They provide Insulation that keeps the cars running, the public satisfied and the revenue steadily mounting in the cash registers.

**IRVINGTON VARNISH & INSULATOR CO.**  
**Irvington, New Jersey.**

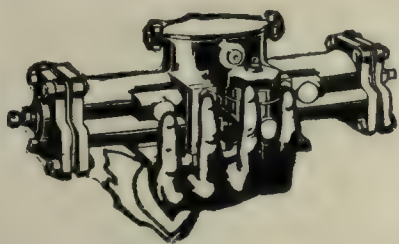




# Use National Pneumatic Door and Step Control

*To Convert Your Open or Gate Cars  
to the Standard Vestibuled Type*

Applied to your present open bench cars, you eliminate running-board accidents. Applied to your present gate cars, you eliminate platform accidents.



Applied to any kind of car, you eliminate the need for the manual labor so scarce and expensive today.

Prices and delivery dates are yours for the asking.

## NATIONAL PNEUMATIC COMPANY

INC.

50 Church St., New York



515 Laflin St., Chicago





A conductor's job will  
be a better job —if the  
car doors are operated with

## Consolidated Door Engines

No need to talk to you Electric Railway men of the shortage in man-power and the limited strength of women. You *know* that. But do you know that the Consolidated Door Engine is the highest development of electric pneumatic door control? With this Engine, even a woman can close car doors smoothly and quietly—

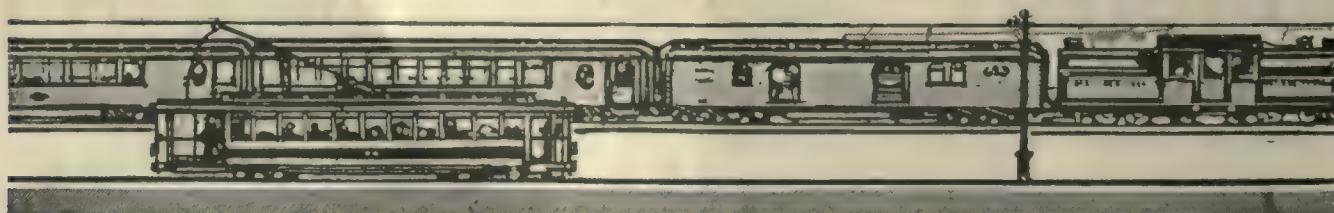
close them with a positive lock—

close them without pinching a passenger—

and close them in *least time* in cold weather.

If your cars have air brakes it's a simple matter to add Consolidated Air-Operated Door Engines. The air is always "off" when the door is not in operation. Meet conditions *now*—with Consolidated Door Engines.

**CONSOLIDATED CAR-HEATING COMPANY**  
ALBANY NEW YORK CHICAGO

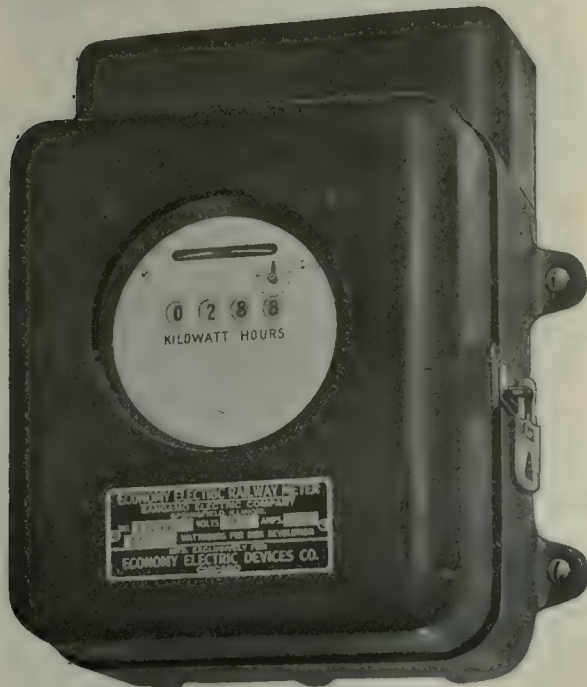




# A General Manager Wrote—

*“—another consideration was that the information furnished is in the EXACT UNITS in which we are interested, viz., K.W.H. per car mile \* \* \* the third consideration was probably the LOWER FIRST COST”*

Sold or Leased



The Watchdog of Your Power

This was written in reply to the inquiry of another manager as to why he purchased the

## ECONOMY METER

The reply set forth precisely what we have contended is a vital advantage in a device for checking and inducing the saving of car-propulsion energy—

### IT METERS THE ENERGY— THAT'S WHAT YOU WANT TO SAVE

Another reason pointed out in the letter for the selection of the ECONOMY Meters was that the road operated over heavy grades, which, in the manager's opinion, would make of little value the results obtained from any other checking instrument or power-saving device. On all his lines but one there are a number of grades ranging from 2% up as high as 10%. Power saving with ECONOMY Meters does not militate against "Safety First."

These points of superiority are of great importance to the prospective purchaser of an energy-saving device.

That any road not now equipped with ECONOMY Meters needs them as a vital adjunct to its power- and coal-saving campaigns we can very quickly and convincingly demonstrate if you will give us the opportunity.

*Let us send you our bulletins on power saving.*

## ECONOMY ELECTRIC DEVICES COMPANY

L. E. Gould, Pres.

Exclusive Sales Agent: Sangamo Economy Railway Meter

District Representative: Peter Smith Heater Co., Old Colony Building, Chicago



# Complete Protection *for* SNAP SWITCHES



Type GSC Condulet

"Here's another new Condulet — Type GSC. It's a dandy and lets me use a snap switch on this outdoor installation.

"No dust or moisture can get inside the Condulet and the thumb knob can't be broken off. The indicating feature is preserved, too."

Type GSC is only one of a complete series of protective Condulets for snap switches. They are especially suited to out-of-door, marine, garage, refinery, and textile and flour mill installations.

*Write for new Condulet Bulletin No. 1000-I  
You will find it valuable*



## CROUSE-HINDS COMPANY

SYRACUSE, N. Y., U. S. A.

NEW YORK

BOSTON

CHICAGO







# Splicing - TAPE - Friction



**T**O withstand severe operating conditions in the electric railway field, friction and insulating tape must be of the highest grade and thoroughly dependable.

United States Tapes meet every service requirement. Their uniform good quality is maintained by the best of raw materials and workmanship.

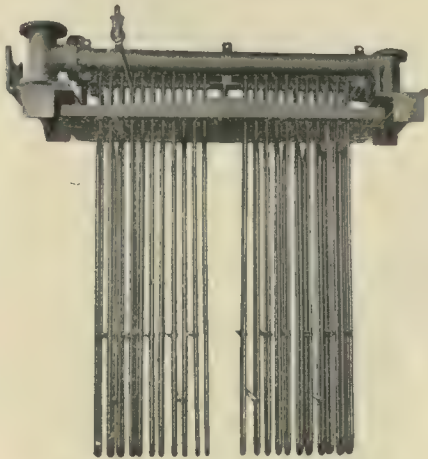
"Holdtite" Friction Tape and "Buckeye" Splicing Compound have long been leaders in their line. Include them in your orders for supplies.

"A Tape for Every Trade and Purpose."

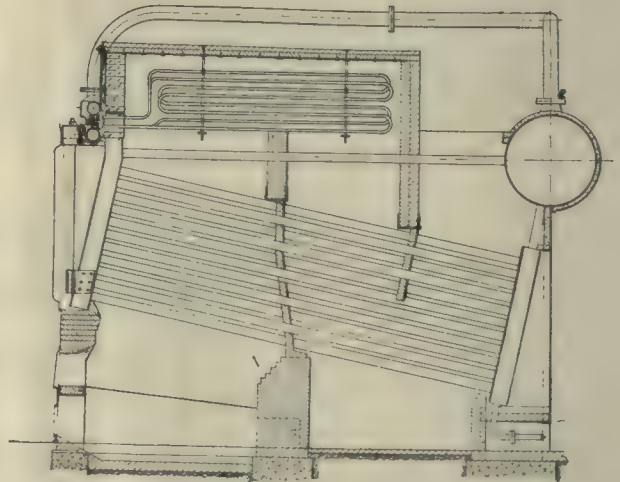
## United States Rubber Company



# Superheaters for Stationary Boilers



The Elesco Superheater



A Typical Installation

## "Conditions in My Plant Are Different"

The engineer who makes that statement is just the man we want to meet. For with our years of experience, and with our realization of the difference in plant conditions, we can work together on the right premises.

A knowledge of correct theory in superheater design and the experience and ability to apply it correctly are necessary before you can look for a practical application in your plant.

Only by a study of your individual plant conditions can we design the Elesco Superheater for your plant, and give you the full benefit of the economy of superheated steam.

The Elesco Superheater makes possible a greater economy and can be applied with few changes in your present layout.

***Your Conditions Can Be Met***

**May we study your power plant?**

*Bulletin BT-1 will interest you. Write for it.*

---

*Designing Engineers and Manufacturers of Steam Superheaters for all purposes*

**Locomotive Superheater Company**

30 Church St., New York City



An active interest has been created in the improvement of work cars for handling materials and the shortage of men has done more than anything else to direct attention toward the need for reduction in men used in this branch of the work. Until recently most bulky material, such as paving blocks, sand, gravel and crushed stone, were handled by men, who loaded the material onto ordinary flat cars at the yards and unloaded it again at the job. Sometimes the men were transported with the load, where there were none available at the point of unloading. From eight to ten men are usually required for this sort of work.

There was a time, not long ago, when any old collection of junk on wheels was considered good enough for a work car. In that day the way engineer who asked for specially designed work-car equipment was apt to be considered somewhat crazy. The development of the automatic side-dumping car has changed all this, much to the advantage of the companies. It is now possible to unload a 3-car train of automatic dump cars with one man, where six or eight were formerly required by such cars. The whole trainload can be dumped in from 3 to 5 min. where it formerly required about 20 to 30 minutes per car. Such equipment has further advantages in the saving of time of the equipment on the road, in lessening of tie-up of passenger car traffic while unloading between cars under regular service conditions, and in availability for use in general revenue freight service in hauling material for highway contractors as well as in the railway coal service.

It has been authoritatively stated that automatic dump-car equipment has saved as much as 30 cents per foot in the cost of track work in a large city in the Central West.

Read these  
authoritative  
words of a  
well-known  
Engineer of the  
Department  
of Ways and  
Structure



then ↘

—look at the type of  
cars he refers to →

## THE DIFFERENTIAL Electric Dumping Car

*Need we add more?*

Differential Car Co., Inc.  
141 Broadway, New York





# The Standards of the American Electric Railway Engineering Association

## Do You Know What They Are?

Here is the list of Standards,  
Recommended Practices, and Recommendations.

**SPECIFY THEM; USE THEM; SAVE EXPENSE**

BUILDINGS AND STRUCTURES		EQUIPMENT (Contd.)		BLOCK SIGNALS (Contd.)	
Section No.		Section No.		Section No.	
Bb 1a	Design of Oil Houses and their Equipment.	Ec 4a	Specification for the Location of End Connections on Interurban Cars for Roads Engaged in the Interchange of Cars.	Ss 9a	Methods of Signaling Double-Track Suburban Railways for Headways Between 1 and 10 Minutes and Speed not Exceeding 30 Miles per Hour.
Bc 1a	Proper Facilities for Employees in Car Houses.	Ec 1b	Repairs of Armatures.	Ss 10a	Methods for Signaling Single-Track Interurban Railways for Headway not less Than One Hour and Speed 40 to 60 Miles per Hour.
Bm 1b	Codification of Underwriters' Rules Relating to Car and Car House Wiring.	Ec 2c	Commutators.	Ss 11a	Methods for Signaling Single-Track Interurban Railways for Headway as Frequent as 15 Minutes for Trains in Several Sections and Speed 40 to 60 Miles per Hour.
Bm 2c	Rules for Instruction to Employees for Fire Protection.	Ec 3b	Insulating Materials for Railway Repair Shop Use.	Ss 12a	Methods for Signaling Double-Track Interurban Railways for Headway as Frequent as 5 Minutes and Speed 40 to 60 Miles per Hour.
Bm 3a	Economical Maintenance of Buildings.	Ec 4b	Practical Rules for Overhauling and Inspection of Electrical Equipment for the Guidance of Car House Employees.	Ss 13a	Sizes of Lenses for Use in Light Signals.
Bm 4b	General Specifications and Forms of Contract for Railway Structures.	Ec 5a	Inspection and Lubrication of Gears and Pinions.	Ss 14a	Design of Signal Apparatus.
Bt 1a	Urban and Interurban Passenger Terminals.	Ec 6b	Protective Devices for Car Equipments.	Ss 15a	Clearance Diagram for Semaphore Signals.
Bt 2a	Fire Protection of Car Houses and Terminals, including Open Yards.	Ec 7a	Lubrication of Motors.	<b>WAY MATTERS</b>	
<b>POWER DISTRIBUTION</b>		Ec 8a	Armature and Axle Liners.	W3d 1c	Location of and Clearances for Third-Rail Working Conductors, Structures and Rolling Equipment.
Df 1a	Clinch Ears for Round Trolley Wire.	Ec 9a	Specification for Trolley Wheels.	W3d 2b	Third-Rail Terminology.
Df 2b	Specification for Galvanizing or Sherardizing on Iron and Steel.	Ec 10a	Taper for Bore of Pinions.	W3d 3a	Protection of Contact Rail Where Protected Third-Rail is Used.
Df 3a	Design of Cap and Cone Insulators.	Ec 11b	Wires and Cables for Car Equipment.	Wf 1a	Designs of Proper Foundation for Tracks in Paved Streets.
Df 4b	Specification for Overhead Line Material.	Em 1b	Rules and Regulations for Inspection of Car Equipment.	Wf 2a	Classification and Bearing Power of Soils.
Dm 1a	Line Lightning Arresters.	Em 2a	Car House Organization.	Wf 3a	Ballast for Suburban and Interurban Lines.
Ds 1b	Specification for Overhead Crossings of Electric Light and Power Lines.	Em 3a	Limit of Wear Gauge for Association's Standard Flange Contour.	Wm 1a	Rules and Regulations for the Government of Employees of the Way Department.
Ds 2c	Specification for 600 Volt Direct Current Overhead Trolley Construction.	Et 1a	Journal Boxes.	Wm 2a	Symbols for Recording Surveys.
Ds 3c	Selection of Poles for Trolley Line Construction.	Et 2a	Journal and Journal Bearing Keys.	Wm 3a	Specifications for Splice Bars for Girder and High T-Rails.
Ds 4a	Specification for Wood Poles.	Et 3b	Design of Axles.	Wm 4b	Design for Joint Plates for Seven-Inch Girder Grooved and Guard Rails.
	Part I—Chestnut Poles.	Et 4a	Design for Tread and Flange of Wheel.	Wm 5a	Design for Joint Plates for Nine-Inch Girder Grooved and Guard Rails.
	Part II—Eastern White Cedar Poles.	Et 5b	Slack Adjuster.	Wm 6a	Design for Joint Plates for Seven-Inch 80 and 90 lb. Plain Girder Rails.
	Part III—Western White Cedar Poles.	Et 6a	Rules for Lubrication.	Wm 7a	Drilling for Standard Section Rails.
Ds 5b	Specification for Tubular Steel Poles.	Et 7a	Dimensions of Rolled Steel Wheels.	Wr 1b	Recommended Designs for Plain Girder Rails for Use in Paved Streets.
Ds 6a	Diagram of Clearances for Overhead Working Conductors.	Et 8a	Specification for Wrought Iron Bars and Limit Gauges.	Wr 2c	Part I—Use of Plain Girder Rails in Paved Streets.
Ds 7a	Specification for Joint Use of Wood Poles.	Et 9b	Specification for Quenched and Tempered Carbon Steel Axles, Shafts and Similar Forgings.		Part II—Designs of Plain Girder Rails.
Du 1a	Specification for Electrical Conduit Construction.	Et 10a	Specification for Cold Rolled Steel Axles.		Specification for the Manufacture of Open-Hearth Girder and High T-Rails.
Dw 1c	Sections of Grooved Trolley Wire.	Et 11b	Specification for Annealed Carbon Steel Axles, Shafts and Similar Forgings.	Wr 3b	Nine-Inch Girder Grooved Rail.
Dw 2d	Copper Wire Tables.	Et 12a	Specification for Solid Wrought Carbon Steel Wheels for Electric Railway Service.	Wr 4b	Seven-Inch Girder Grooved Rail.
Dw 3b	Specification for Round and Grooved High Conductivity Trolley Wire.	Et 13a	Proof Testing of Forgings to Determine Their Soundness after Quenching and Tempering.	Wr 5a	Nine-Inch Girder Guard Rail.
Dw 4c	Specification for High Voltage, Three-Conductor, Paper Insulated Lead Covered Cable.	Et 14a	Specification for Case Hardened Forged Steel Gears.	Wr 6a	Seven-Inch Girder Guard Rail.
Dw 5b	Specification for Single Conductor, Paper Insulated, Lead Covered Cable for 1200 Volts.	Et 15a	Specification for Quenched and Tempered Forged Carbon Steel Gears.	Ws 1b	Layouts for Track Switches, Mates and Frogs.
Dw 6b	Electric Wire and Cable Terminology.	Et 16a	Specification for Case Hardened Forged Steel Pinions.	Ws 2a	Rules for Determining Gauge of Track on Curves.
Dw 7a	Hard Drawn Aluminum Wire Table.	Et 17a	Specification for Quenched and Tempered Forged Carbon Steel Pinions.	Ws 3a	A Uniform Method for Designating Compromise Joints.
Dw 8b	Specification for Rubber Insulated Wire and Cable for Power Distribution Purposes.	<b>POWER GENERATION</b>		Ws 4b	Specification for Materials for Use in the Manufacture of Special Track Work.
<b>EQUIPMENT</b>		Gb 1a	Specification for Lapwelded and Seamless Boiler Tubes.	Ws 5a	Specification for Solid Manganese Steel Special Work for Girder Rail.
Eb 1b	Brake Head, Shoes, Keys and Gauges.	Gb 2a	Specifications and Contract for Purchase of Fuel.	Ws 6a	Specification for Cast Steel Construction Hard Center Special Work.
Eb 2a	Inspection of Brakes.	Bb 3a	Boiler Code of A. S. M. E.	Ws 7a	Specification for Iron Bound Hard Center Special Work.
Eb 3a	Air Compressor Maintenance and Inspection.	<b>BLOCK SIGNALS</b>		Ws 8a	Specification for Plain Bolted Special Work.
Eb 4b	Specification for Air Brake Hose.	Ss 1a	Aspects for Two-Position Signaling.		
Ec 1b	Dimensions for Cars, Including Heights of Couplers, Bumpers and Platforms.	Ss 2a	Use of Semaphore Signals.		
	Part I—Height of Couplers for City Cars.	Ss 3a	Fundamental Indications in Signaling.		
	Part II—Height of Platforms for Interurban Cars.	Ss 4a	Aspects in Three-Position Signaling.		
	Part III—Height of Bumpers for City and Interurban Cars.	Ss 5b	Light Aspects in Three-position Signaling Employing Signals Operated by Contractors.		
Ec 2b	Automatic Couplers for Interurban Cars and Radial Draft Rigging, Including M. C. B. Specifications for Couplers.	Ss 6a	Light Aspects for Car Spacing Signals Operated by Contractors.		
Ec 3a	Comparison of Car Weights and Seating Capacity.	Ss 7b	Use of Continuous Track Circuits for the Control of Automatic Signals for High Speed Interurban Service.		
		Ss 8a	Methods of Signaling Single-Track Suburban Railways for Headway Between 5 and 20 Minutes and Speed not Exceeding 20 Miles per Hour.		

American Electric Railway Engineering Association

8 West 40th Street, New York, N. Y.



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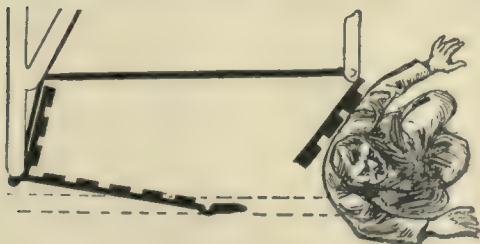
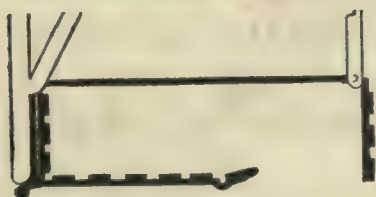
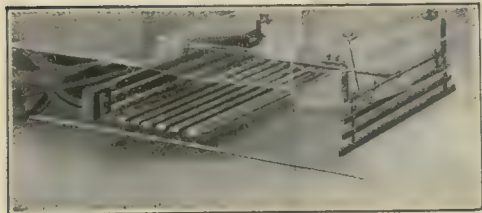
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## The Center of Traffic in Oil, Coal and Steel

The development of adequate railway service changed the whole direction of Pittsburgh's commerce.

In 1846, at the time the picture was made from which the above illustration is reproduced, Pittsburgh commerce was largely water borne.

With the development of railway facilities Pittsburgh found, of course, tremendous increase of opportunities for the outlet of its products East and North.

Today in population alone Pittsburgh is more than thirteen times as large as it was at the time of this picture and the growth in the increase of its commerce may be judged from the fact that its total annual output was valued in 1846 at the handsome sum of seven millions of dollars!

Internal as well as external railway development has aided Pittsburgh's mighty growth. The Pittsburgh Railways Co. alone operates 605 miles of electric railway track for the intramural service of the population. And in both the internal and external railway activity an important and helpful part has been played by

# Galena Oils

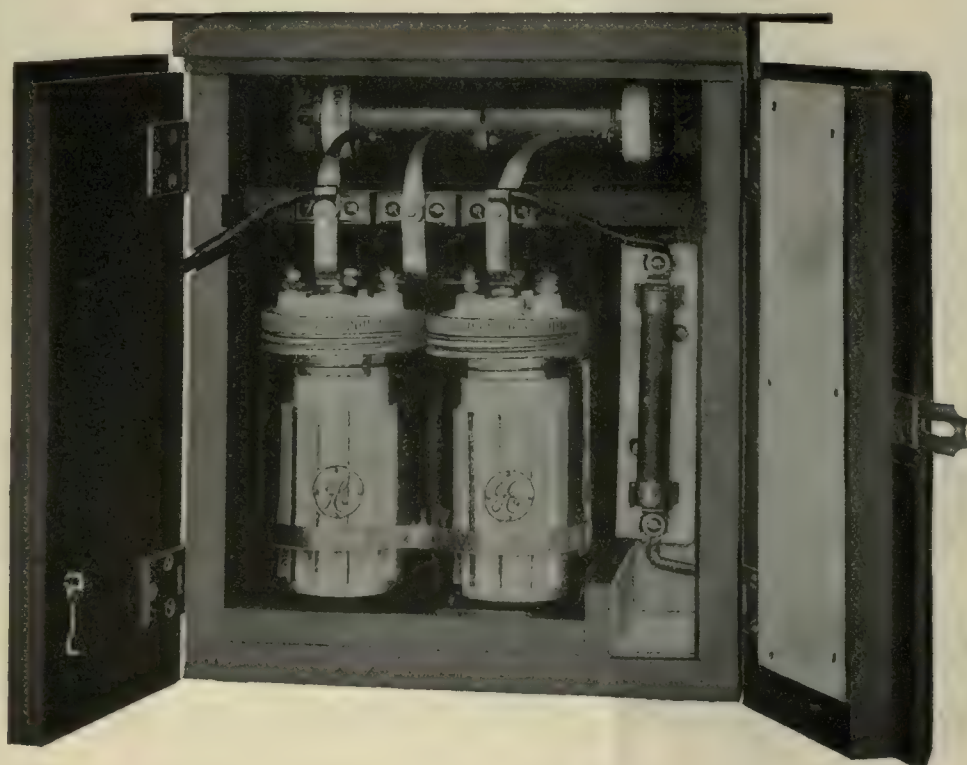
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## ALUMINUM Lightning ARRESTERS

The G-E Aluminum Arrester for electric railway service has proved for years that it will protect against lightning. It is an electrolytic safety valve and an aluminum condenser in one. It is easy to install and is economical in upkeep.

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We have a stock on hand but transportation is uncertain. Order now to get the highest class protection during 1919.

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\*Southwest General Electric Company. For Canadian Business refer to Canadian General Electric Company, Ltd., Toronto, Ont.  
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# Electric Railway Journal

Consolidation of STREET RAILWAY JOURNAL and ELECTRIC RAILWAY REVIEW

Volume 53

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Number 14

## Safety Rules Produce Best Results When Few and Specific

THE very excellent efforts of the advocates of accident reduction may partly defeat their ends by too great wideness of scope. In the desire to promote general safety the propaganda may be spread out too thin. It is usually better to concentrate attention upon a few definite and considerable dangers which exist on a given property, dangers which are readily recognized by the men who have it in their power to reduce them. A good example of this is the recent poster on "wyeing" put out by the Ontario Safety League of Toronto. It says: "Mr. Motorman, when you throw on the reverse to 'Y' you cannot see plainly where your car is going. Make sure the conductor is on the job on the back platform. Mr. Conductor, when your car is backing at a 'Y' your place is on the back platform ready to give the motorman the bell. You are then the eyes of the car." This is concrete; it is simple; it has evidently been called for by some conspicuous hazards. The important thing about all safety suggestions or rules is to aim them first at the most prolific sources of accident. The emphasis can easily be shifted from time to time, and from place to place, as indeed it should be if for no other reason than that variety is the spice of safety interest as well as of life generally.

## War Labor Board Deplores Public Reluctance to Aid Railways

A POINTED admonition to the public that it should not dally in doing its duty to the electric railway industry was recently given to a Denver citizens' committee by Charlton Ogburn, examiner in charge of the electric railway department of the National War Labor Board. While Mr. Ogburn's words, as abstracted elsewhere this week, simply indicate once more an attitude of concern on the part of the board for not only the economic welfare of employees but also the financial preservation of utilities, one can see in the very reiterations of this second point an impatience with public stupidity or unwillingness in hesitating to fulfill its obligations.

A large part of the public is suspicious because so many railways have broken their long silences by campaigns for "telling facts" only when their hide became pinched between a fixed fare and increased costs. On the other hand, public leaders should be intelligent enough to know, and to try to bring others to know, that no matter how backward a company's publicity policy has been in the past, the railway is still essential to public welfare and must not be allowed to go to ruin.

The responsibility of public leaders was well summarized by William H. Taft, co-chairman of the War Labor Board, when he sent to the recalcitrant City Council of Memphis a letter in part as follows:

It is not fair that the public should take advantage of a public utility company and hold it down to an ante-war contract in this regard [to escape paying the cost of transportation in war times]. . . . We should think that the equity of the company in this matter should appeal to the fair-minded people of Memphis and to their representatives in your honorable body.

The leaders in Memphis took no heed, and a receivership resulted. But as Mr. Taft continued, courts cannot borrow money any better than the companies if they cannot give any better security. We insist, therefore, that a constructive rather than destructive means of meeting the situation is demanded. Cities such as Memphis and New York are only causing needless sufferings for themselves and their citizens by refusing to listen to the warnings of the War Labor Board.

## The Labor Organization and Legal Responsibility

DISREGARD of contract obligations by organized labor, so frequently the cause of strikes on electric railways, has again directed attention to the question, "Why should not trade unions be compelled to incorporate?" John H. Walker, president of the Illinois Federation of Labor, answers this query in a recent issue of *Manufacturers' News* and some of the points which he makes are worthy of discussion.

In brief, Mr. Walker's argument is that there is no similarity between the methods by which the men who become officers and members in a corporation are selected and the methods by which men become members or officers of a labor union. The result, he says, is that members or officers of a corporation are able to protect themselves in making a choice of their associates, while the labor unions do not have the time, the facilities or money to discriminate in the selection of their members or officials. He maintains, however, that usually the trade union influences its members, as far as it can, to live up to contracts, and penalties are imposed where this is not done.

The trouble with Mr. Walker's statement is that some of the points which he makes have not been proved true by experience. It is too evident that the average labor union does not draw the line on the unfit when adding to its membership. Its object seems to be "quantity rather than quality," and the result is a heterogeneous mixture of individuals who sometimes refuse to "stay put" when the terms of an agreement are not to their liking. Mr. Walker says about this class of members: "The poor devil who is uninformed or not just normal in disposition is here and must make a living. Do you want the workers to assume all responsibility for him, or do you want him left alone to be used unjustly to his own injury and to the injury of the other workers?" How does the union president reconcile this statement with his excuse that proper discrimination is prevented by the lack of time, money and other facilities. The fact



appears to be that these organizations want all the members they can get so that they may gain their point by force of numbers.

We are making no argument here against the right of workmen to organize. We do maintain our belief, however, that labor organizations should be made legally responsible so that employers will be justified in dealing with them. No sane persons will say that employers have a monopoly on honor or that a broken contract is always due to the employees. On the other hand, we contend there can be no disputing the fact that organized labor should not put itself beyond the jurisdiction of the courts when the question of liability for disregard of solemn agreement is an issue. It is assumed that persons who sign a contract do so with eyes open and they should be ready to take the consequences. The past few years have shown the desirability of maintaining harmonious relations between capital and labor, and the future will hold a better prospect if all parties to an agreement are placed in a position where they can be punished for acts or evasions which have a tendency to disturb such relations.

### A Strikingly Complete Report on a Vital Subject

THE abstracts which we have been printing of the Public Service Railway on its proposed zone system of fares were completed last week. One would have to go back a great many years, possibly as far back as the historic report made by the Boston railway officials on their visit to Richmond in 1888 when they decided that electric power was feasible for a large city property, to find an electric railway report which has attracted so much attention from other companies. The reason for this interest is not far to seek. In the first place, no topic is of greater importance now than that of a schedule of fares which will appeal to the public as reasonable and yet will yield the return necessary to keep a railway company in good financial condition. In the second place, the preliminary study made by the company to solve this problem, so far as its own property was concerned, was most extensive, taking the greater part of the time of several of its major officers for some seven months and requiring the employment of outside experts as well as of an extended staff of clerks, checkers and other employees reaching a maximum number of 171. Finally, the conclusions reached as to the proper fare to be charged, though based on a scientific analysis of the cost of car operation, is entirely new in electric railway practice, and accompanying it there has been developed a most ingenious method of collecting and accounting for the fares proposed.

It is true that the company does not speak of the system as being applicable to other properties. It was developed for the conditions existing in New Jersey, which in some respects are peculiar, as explained in the report. Nevertheless, the effort put upon the undertaking by the company must be of great value to other railways. By this we do not mean that the actual rates established for the stand-by charge and for the movement charge in New Jersey would apply to other railways or that in other circumstances it might not be advisable to shift some of the theoretical stand-by charge from the short-haul to the long-haul passenger or vice versa. This would have to be determined on each property separately. Indeed, in such a radical change in electric railway practice as is involved in an abandonment of the uniform nickel fare, many plans

undoubtedly will be proposed and probably will have to be tried before an ideal solution for each property will be reached. But it is safe to say that the more trained minds that can be put upon this problem and the more that the industry in general approaches it without prejudice and preconceived opinions the better. It was with this spirit that the Public Service Railway undertook the problem and it was because of this spirit that it was able to break away from old traditions. It is only in this way that the correct answer will be reached.

### High Spots for Electric Railway Men in the A. R. E. A. Meeting

MANY of the reports presented at the recent meeting of the American Railway Engineering Association in Chicago have a close connection with electric railway affairs. Notable among them in this respect is the report of the committee on rail as it gives the results of important studies made during the past year on rail breakage, rail specifications, rail testing, rail joints and joint testing and frictionless rail. The section on rail joints, for instance, should be of especial interest to electric railway trackmen because the results of the committee's tests indicate that there is much virtue in the ordinary splice bar provided it is correctly designed and is subjected to proper heat treatment. It also appears that there is little if any difference in strength as between six-hole and four-hole bars of the same cross-section. While the latter point has been fairly well proved in electric railway service, it is a source of satisfaction to have the question settled authoritatively. The shorter bars naturally weigh less, cost less, have fewer bolts and require a shorter bond when the bond is outside of the splice bar. It is further stated in the report that the customary length of four-hole bars may safely be reduced from 23½ in. to 18½ in. without decreasing their efficiency. Another point made was to the effect that the ordinary bar, when redesigned, heat treated, and used with heat-treated bolts will develop greater strength than either of two otherwise stronger types of splice bars, untreated. A standard method of tests for rail joints which provides uniform laboratory testing procedure has been wanting and this lack is now supplied by the method proposed by the rail committee.

In connection with the proposed modifications in rail specifications, the hydraulic or quick bend method of testing is suggested as an alternative for the drop test because it gives more complete information, is quicker, and the breaks are nearly always normal tension breaks of the part in tension, which is very frequently not true in the drop test.

The important subject of transverse fissures in rails was under investigation in many quarters and considerable progress was made. Evidence seems to be accumulating which indicates that both mill practice and chemical composition have more to do with their formation than has generally been ascribed to these factors and that they are not fatigue fractures as has been supposed. Among other things, it has been found that high phosphorous streaks are present in certain types of transverse fissures, and such fissures have been found in rails which have never been in service.

The committee on economics of railway operation presented a report on reclamation and utilization of scrap material which is now a subject of the greatest importance. Until recently, railroads have been waste-



ful and indifferent with one of their largest assets—material. Meanwhile, the scrap dealers were reaping a harvest in selling reclaimed materials back to the railroads.

The electric roads are now saving thousands of dollars annually through the work of the reclamation service. The work started with straightening and rethreading bolts which are so largely used in the way and equipment departments. It has now been extended to other materials by means of electric, thermit and oxy-acetylene welding. This report should be read by electric railway managers and engineers.

The report of the committee on wooden bridges and trestles contains a classification of the uses of lumber which emphasizes the many ways in which railroads use lumber. The committee presented a tentative report covering proposed general specifications and classification and grading rules for timber and lumber which it hopes can be referred to as standard for material of this kind under all circumstances. The work is herculean but its accomplishment in the manner proposed would be of the greatest benefit to all users and manufacturers of railroad lumber and timber.

We have here briefly noted some of the more important matters which the American Railway Engineering Association has under investigation because so many of them cover subjects in which electric railway officials are greatly interested and a careful reading of the full reports will be found well worth while.

### The Skip Stop Is Worth Saving

REPORTS for the full year of 1918 announced by various companies are too few in number as yet to give any adequate information on the effect of the skip-stop system as indicated by the relation of car-hours and car-miles operated. We have no doubt, however, that the properties which have made proper use of this system for an extended period will make an improved showing in the item of "miles per hour." For this reason it is to be regretted that the authorities here and there are ordering a restoration of the old system of frequent stops which can serve no good except to please interested property owners and accommodate a small percentage of the riders.

In this connection it is interesting to hear reports from some of the companies which were authorized to eliminate certain stops about the time that new rates of fare were put into effect. These companies report that the necessity of collecting fares of more than one unit slowed up the car movement to such an extent that their only salvation was in the saving of time due to the skip-stop system. Without the advantages of this system there must have been a noticeable deterioration of service due to the slower movement of cars and consequent congestion in crowded districts.

We cannot understand why the authorities in certain cities are acting so hastily to revert to the former method of operation when the reports from Detroit, Philadelphia, Toledo and other places where careful studies have been made, indicate that the elimination of unnecessary stops has distinct advantages for the public as well as for the utility. The testimony of Mr. Swartz of Toledo of the increased safety from the skip stop, published in this week's issue of the paper, is corroborative of similar testimony from Detroit and is notable evidence of one advantage gained by the public from the skip stop. It may be contended that the war is over, but this is no

excuse for going back to wasteful practices. It is to be hoped that the people have taken to heart some of the lessons of recent years. Ignorance is no longer bliss.

### New England Points the Way to Public Support of Electric Lines

A KEENER sense of the responsibility of the State for continued electric railway service seems to be possessed by New England than by other sections of the country. This is particularly the case in Massachusetts and Connecticut, which, from an electric railway point of view, are by far the most important, possessing together about three times as many cars and miles of electric track as the four other states of New England combined.

It may be that several abandonments of electric railway properties in this section have brought close home to the public and the authorities the essential nature to the community of this kind of transportation. It may also be that a pioneer movement as regards the proper financial treatment of electric railways is beginning in New England just as that part of the country took a leading position thirty years ago as to the early electrical equipment of these same railways. Whatever the cause, the movement as well as the forms that it is taking are worthy of note.

In Massachusetts the tendency is marked toward direct aid from the State treasury to make up deficits where they occur from railway operation. The Boston Elevated contract was the pioneer in this line. In this case, the State trustees are expected, under the law, to adjust the fare to cover deficits, although the State stands back of the company, for each fiscal period of a year, to make good any loss from operation, including in operating charges both depreciation and obsolescence. During the last six months of 1918 the deficit for which the State thus became liable aggregated more than \$3,000,000. In the "50-50" bill of the Bay State system, however, the State would defray half of the expense beyond 5 cents of carrying passengers on the electric lines, the car rider to pay the other half. In both of these instances, the State would collect its payments to the companies from the communities benefited. The same general plan is recommended by the Public Service Commission of Massachusetts for other parts of the State.

In Connecticut, the State authorities also recognize the seriousness of the situation, though they are hoping to relieve it without direct State aid. Hence there arise the recommendations, abstracted in this issue, of the special investigating commission for a temporary deferment of taxes, a temporary positive relief from pavement and bridge charges, and other means of bringing down the cost of service. In New Hampshire, too, solicitude is being felt for the fate of the electric lines, and remedial legislation is being urged on the State by the Public Service Commission somewhat along the lines being followed in Massachusetts and Connecticut.

These are favorable signs of an awakened public conscience, or perhaps we should say a clear realization that electric roads constitute one of the fundamentals of public welfare. It is not every citizen that can purchase an automobile to take him about if the trolleys fail. In the interest of the entire community these essential means of transportation must be kept alive and capable of giving good service. This fact is one which other sections of the country besides New England should understand.





North Main Street Façade of the Office Building, Train Shed in Background

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## *Akron's New Interurban Terminal*

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The Electric Light and Power Office, Designed According to Bank Standards





# New Akron Terminal in Operation

The Interurban Terminal of the Northern Ohio Traction & Light Company Handles Between 10,000 and 15,000 Passengers a Day with an Average Five-Minute Train Schedule from 6 a.m. to 6 p.m.

THE recent completion of the train shed of the Northern Ohio Traction & Light Company's new terminal permits the company now to apply the latest methods in providing for the convenience and safety of patrons who furnish its large interurban business. A short description of the construction features of this building, together with several reproductions of construction drawings, appeared in the issue of this paper for March 9, 1918, page 465. The building proper was finished and the offices of the company opened on May 1, the train shed being completed about eight months later. A large business is now being handled.

The new terminal is located in the heart of the city on Main Street from which the proposed North Hill viaduct will extend across the Cuyahoga Valley so that ultimately trains arriving and leaving the terminal will travel only on Main Street. The main transfer point of the city lines is one block away. Before the new terminal was constructed interurban cars were loaded

on the street. This practically tied up a whole block on Main Street in the busiest section of the town, as part of the time the cars parked on both tracks and practically all of the time the south-bound track was occupied.

The general layout of the terminal building and train shed is shown in one of the drawings reproduced

on page 682, and another gives the ground floor plan in more detail. Through the front corridor one enters a spacious waiting room, the interior finish of which is Caen stone on walls and ceilings with Tennessee marble wainscoting and floor. The seats, of which there are two groups on each side of the aisle from the corridor to the ticket office, are of old English finish. The ticket office is of marble construction throughout. Entrance to trains is at the right of the ticket office while incoming passengers enter at the left.

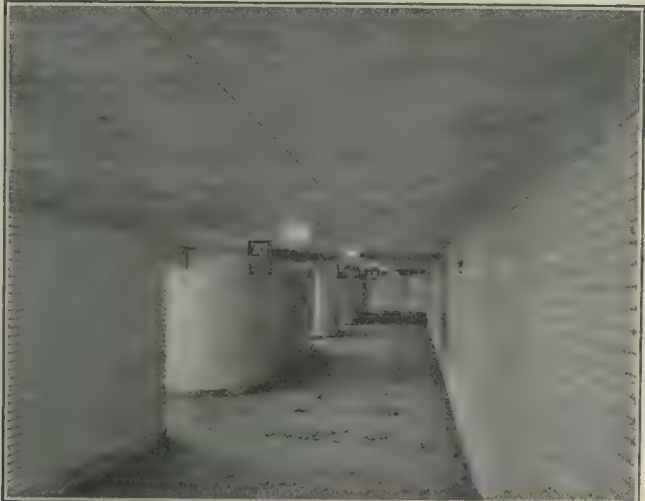
On the south side of the waiting room is a telephone lobby with five booths. From this there is direct entrance to a lunch room and a restaurant on the ground



THE WAITING ROOM, WHERE PLEASING STATELINESS PREVAILS

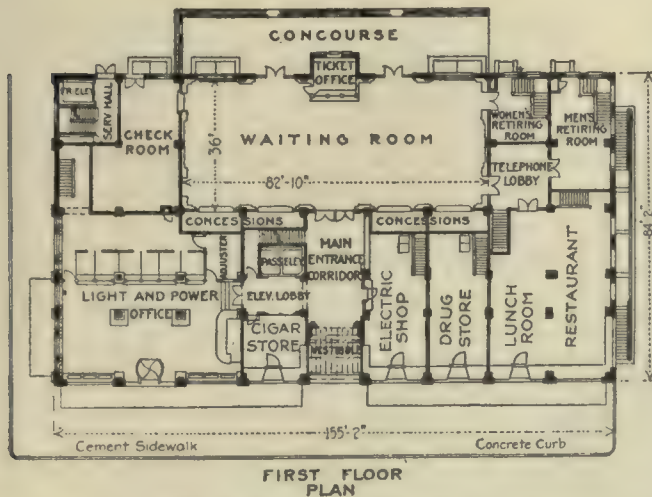


ENTRANCE TO THE SUBWAY, SHOWING THE TRACK ANNOUNCEMENT BOARD



THE SUBWAY WITH ITS LUCID DIRECTIONS TO PASSENGERS

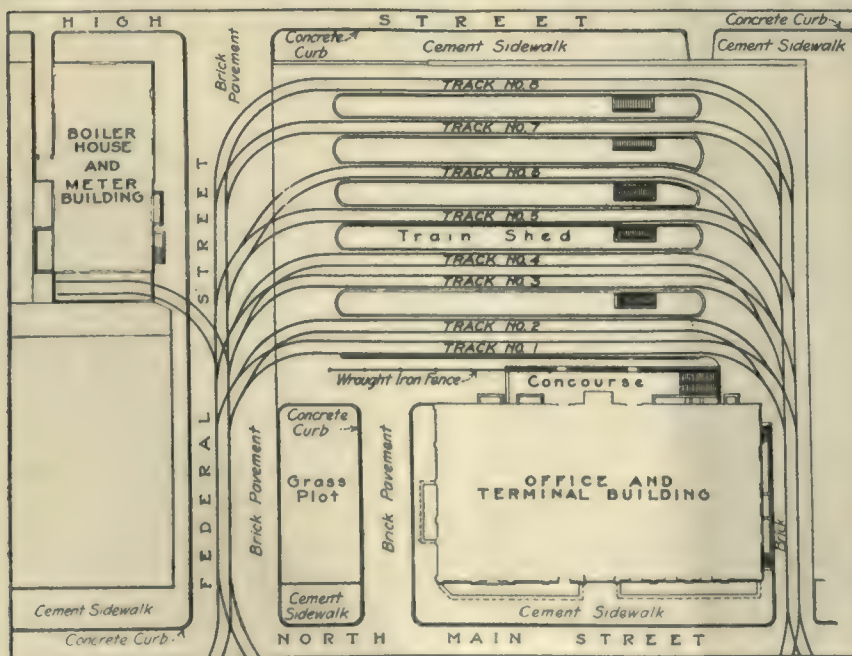




PLAN OF FIRST FLOOR OF TERMINAL BUILDING

floor and to a more artistically decorated restaurant in the basement. The telephone lobby also furnishes entrance to the men's retiring room, which will contain a barber shop on the ground floor and toilet facilities in the basement. The women's retiring room is also on the south side of the waiting room. At the north end of the waiting room is a check room, for both parcels and baggage, and a lost and found department. Here on the wall is a cork bulletin board, and no papers of any sort are allowed on the walls of the room elsewhere than on this board. The entire west side of the room is occupied by news, candy and cigar stands, and accessible over a marble ledge are the wares of a drug store occupying the store space adjacent to the lunch room. The lunch room, restaurants, drug store, cigar store and all inside concessions are leased to the Union News Company.

Before boarding trains passengers are required to purchase tickets which are canceled by the gateman at the "Entrance to Trains" door. This leads directly to a stairway which gives access to an underground passageway, from which passengers come up again to concrete platforms between the tracks in the train shed.



GENERAL LAYOUT OF TERMINAL BUILDING AND TRAIN SHED

Special attention is called to the provisions made to prevent confusion of passengers. When the train is ready it is announced through annunciator horns located on the east wall of the waiting room and through similar horns located in the retiring rooms and restaurants. The announcing can be done either by the trainmaster in the signal tower, seen in the background in one of the illustrations, or by the gateman from a booth near the head of the tunnel stairs. Before a passenger enters the tunnel he sees the announcement board at the head of the stairs, and in the tunnel each track is clearly marked. In the train shed, overhead boards again signify the track upon which a desired train stands.

All trains enter the shed from the south end and as they approach the entrance the trainmaster in the signal tower throws the proper air-controlled switch at the same time setting to red a light at the north end of the track. One minute before leaving time the gateman locks the door and clears the red signal.

At the present time track No. 1 is used as a baggage track and baggage is unloaded direct from trucks onto a platform outside the check room. From here it is moved directly into the baggage cars, never being placed inside the building unless it is to remain over night. The Canton local uses track 2 and the Canton limited track 3. As the local leaves on the even hour and the limited on the half hour, passengers are never simultaneously boarding two trains from the same platform. This is true throughout the station. Track 4 is used by the Cleveland local, track 5 by the Cleveland limited and track 6 by the Akron-Kent-Ravenna local, each of these tracks being served by an individual platform. Track 7 is for special and private cars and track 8 is at present used for storage purposes.

It is estimated that between 10,000 and 15,000 persons are handled through the terminal every day, and 108 trains leave the terminal daily. The first cars out of the terminal north and south leave at 5 a.m. From this time on hourly local service is maintained in each direction and hourly limited service to Cleveland from 6.10 a.m. until 9.10 p.m., with the last car leaving at 12 o'clock midnight. Limited trains leave every two hours for the South from 7.30 a.m. until 5.30 p.m. with an additional limited at 11.30 p.m. A thirty-minute schedule is operated over the Kent-Ravenna branch from 4.50 a.m. until 8.20 p.m. and then hourly until 11.20 p.m. Six baggage trains a day are operated through the terminal, one a through train to Detroit daily except Sunday, and baggage is checked just as on a steam road. Between the hours of 6 a.m. and 6 p.m. a train arrives at and one leaves the terminal, on an average, every ten minutes.

The terminal employees include one station master; two gatemen; two trainmasters; two car inspectors; two train-shed janitors; one building janitor; two checkroom clerks; two porters in the men's retiring room; two matrons, and four ticket agents. The waiting room is mopped, scrubbed and disinfected every night and main-



tained during the day like the lobby of a first-class hotel. All general offices of the company are at the new terminal and occupy the entire building with the exception of a few rooms on the fourth floor. The corridors throughout the building have Georgian and white Italian marble wainscoating and floors and the wood-



INTERIOR OF THE TRAIN SHED, SHOWING THE ENTRANCE AND THE SIGNAL TOWER IN THE CENTER BACKGROUND

work is old English. The outside of the building is terra cotta with granite finish. There is an electric globe in every cornice opening around the top, and a large electric sign will soon be erected on each side of the marquise.

### American Welding Society Holds First Meeting

THE first meeting of the American Welding Society for forming a permanent organization was held in the United Engineering Societies Building, New York City, on March 28. Prof. C. A. Adams called the meeting to order and gave a brief address on the temporary association which had been formed which had led to this meeting. A form of constitution and by-laws proposed by the temporary committee on welding was adopted as a whole, after which the following officers were elected: President, C. A. Adams; vice-president for one year, J. M. Moorehead; vice-president for two years, G. L. Brunner; directors for one year, W. M. Beard, M. H. Roberts, M. M. Smith, L. D. Lovekin, Alexander Churchward, W. H. Patterson, W. J. Jones and C. A. McCune; directors for two years, R. R. Browning, A. S. Kinsey, Victor Mauck, E. L. Hirt, J. F. Lincoln, H. M. Hobart, D. C. Alexander and H. R. Swartley, Jr.; directors for three years, L. H. Davis, E. L. Mills, D. B. Rushmore, James Burke, D. H. Wilson, Jr., Hermann Lemp, C. J. Nyquist and Alexander Jenkins. Prof. Elihu Thomson was elected as the first honorary member.

A resolution was adopted holding the charter of the society open for ten days so that those filing applications before April 8 can enter as charter members.

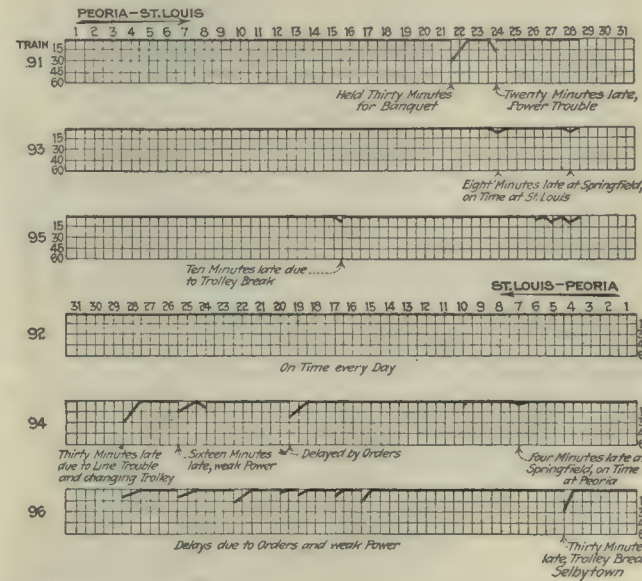
A meeting of the directors elected was held immediately after the society adjourned, at which H. C. Forbes was chosen as permanent secretary for the society and W. E. Symons as treasurer.

### Graphic Record of Limited Train Operation

H. E. CHUBBUCK, vice-president executive of the Illinois Traction System has had made up and hung in his office a chart which shows graphically the daily running time of each of the six fast trains operating between Peoria and St. Louis. There are two parlor car trains and one sleeper each way per day. The chart, which covers a period of one month and is kept up each day, shows at a glance whether each train was on schedule or the number of minutes delay. If there is any considerable delay the reason is entered under the drop in the otherwise horizontal line.

The numbers at the top and center of the chart represent the days of the month. The upper three forms are for the trains running from Peoria to St. Louis and the lower three for those operating in the reverse direction. In the first three of these forms the first vertical line represents Peoria, the starting point, and is black. The second line, representing Springfield, is red, and the third, representing both St. Louis, the finishing point, and Peoria, again the starting point for the following day, is black, and so on. The horizontal lines are all red except the top one which is black. The train line is put on with heavy red crayon and shows very plainly. Each horizontal space represents a period of fifteen minutes.

Train No. 91 is a through sleeper leaving Peoria at 11.30 p.m. and arriving in St. Louis at 6.50 a. m. This



FEBRUARY CHART RECORD OF LIMITED TRAIN OPERATION ON THE ILLINOIS TRACTION SYSTEM

train was on time at its destination during February although it left Peoria one-half hour late on Feb. 22 in order to handle returning delegates from a banquet. Train No. 93 leaves Peoria at 8 a.m. and arrives at St. Louis at 2 p.m. This train had a perfect record for the month, as also did train No. 95 which leaves Peoria at 11 a.m. and arrives at St. Louis at 3 p.m.

Concerning trains operating from St. Louis to Peoria, train No. 92 is the sleeper leaving at 11.45 p.m. and arriving at 7 a.m. Train No. 94, which leaves at 9 a.m. and arrives at 3 p.m., was delayed in arriving only three times, due to line trouble and orders. Train No. 96, leaving St. Louis at 8.55 p.m., was late in arrival only five times, one delay being due to a trolley break and the others to power trouble and orders.



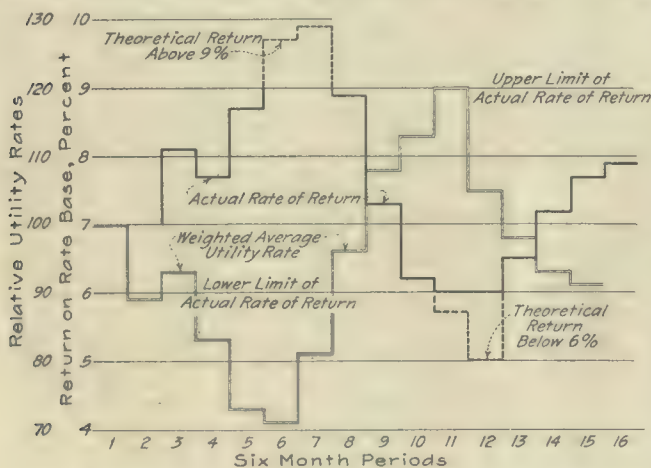
## Sliding Scale of Return with Combined Services

**Proposed New Brunswick Resettlement Provides for Railway, Electric and Gas Service at Cost With Reward for Efficiency**

THE New Brunswick Power Company, St. John, N. B., Canada, is at present concerned in a very interesting proposal in connection with utility regulation. An investigating commission has proposed resettlement which provides a most striking combination of the service-at-cost principle with a sliding scale of return on investment, based on combined rates for railway, electric and gas service.

In 1918 the Lieutenant-Governor in Council was empowered by the Legislative Assembly of New Brunswick to appoint a commission to examine the condition of the company and make recommendations in connection therewith. The members appointed were Guy W. Currier, chairman; Henry Holgate and Prof. Albert S. Richey. This commission has now reported certain recommendations which it is believed will be of interest to electric railway operators.

It is recommended that the control of operation, maintenance, service and rates be vested in a board of seven



NEW BRUNSWICK FRANCHISE—EFFECT OF WEIGHTED AVERAGE UTILITY RATE ON RATE OF RETURN

For the purpose of illustration, more violent fluctuations in the utility rates have been assumed than are likely to occur in actual operation. In the fifth and sixth six-month periods the utility rates drop 27 per cent and 29 per cent respectively, indicating theoretical rates of return on the rate base of 9.7 per cent and 9.9 per cent in the sixth and seventh six-month periods. The actual rate of return during these periods remains at the maximum of 9 per cent.

Similarly, in the tenth and eleventh periods, the utility rates increase 13 per cent and 20 per cent respectively, indicating theoretical rates of return of only 5.7 per cent and 5 per cent in the eleventh and twelfth periods, while the actual rate of return remains, during that time, at the minimum of 6 per cent. So long as the theoretical rate of return remains between 6 per cent and 9 per cent, the actual rate of return coincides with the theoretical, as indicated.

directors, four elected by the company and three appointed by the Lieutenant-Governor in Council for three-year terms at annual salaries of not more than \$1,000. Moreover, it is said that an experienced public accountant should be chosen annually by the public directors, with the approval of the company directors, to report semi-annually on financial operations.

The commissioners are of the opinion that no special taxes of any kind should be assessed against the company, which should be required to pay only such property, income and other taxes as are paid by other general corporations in the Province. The company

should not be required to pay for any street or road repairs, except those made necessary by the maintenance, renewal or construction of its own way and structures, or for the removal of snow from any street or road or for any part of the cost of construction of new pavement or change in the pavement. The company should not be required to pay rental for the use of any street or bridge beyond the expense of maintenance of tracks. The reason given is that such tax payments would be reflected in the cost of service and thus result in higher rates.

The board of directors would fix from time to time such rates for railway, electricity and gas services as would meet but not exceed the cost of service, which should include operating expenses, taxes, maintenance, depreciation allowance, return on investment, and any other expenditures properly chargeable against income. An annual allowance of \$75,000 should be set aside out of earnings for depreciation (to be increased as the investment increased) until the fund amounted to at least \$200,000 and in no case less than 7 per cent of the rate base, after which time such an amount should be added annually as would keep the fund intact at this sum. The directors should charge to the annual cost of service, as a return on the rate base of Jan. 1, 1919, 7 per cent of such base, plus or minus additional percentages according to the fares and service charges in force.

### RATE OF RETURN TO BE BETWEEN 6 AND 9 PER CENT

At the time of the semi-annual audit, the accountant should determine the average fare received per passenger, the average rate per kilowatt-hour and the average rate per thousand feet of gas, and calculate such average rates as percentages of similarly calculated average rates during the six-month period from Jan. 1 to June 30, 1919. By giving due weight to these three percentages, based on the proportionate amount of gross revenue received from the different services, he should then calculate the weighted average percentage by which the rates during the preceding six months had been increased or reduced compared to those in effect during the period from Jan. 1 to June 30, 1919.

The theoretical rate of return on the rate base for the following six-month period should then be 7 per cent plus one-tenth of 1 per cent for each 1 per cent by which such weighted average rate for service had been so reduced. Similarly, the theoretical rate of return should be 7 per cent minus one-tenth of 1 per cent for each 1 per cent by which such weighted average rate had been so increased. The actual rate of return, however, should be not less than 6 per cent or greater than 9 per cent, notwithstanding the fact that the theoretical rate of return might be greater than 9 or less than 6 per cent. The accompanying diagram shows the changes in return which would follow varying the weighted average rates assumed for the purpose of illustration.

The commissioners recommended that legislation providing for the above features be passed and that the acceptance of the new legislation shall be made to constitute an agreement on the part of the company to sell at any time to the Province or any of its political subdivisions all the property included in the rate fare for cash equal to the rate base as then determined plus 10 per cent and any premium required to retire bonds. The company should then be protected from competition on the part of private or municipal plants.



# Electric Railways in South Africa

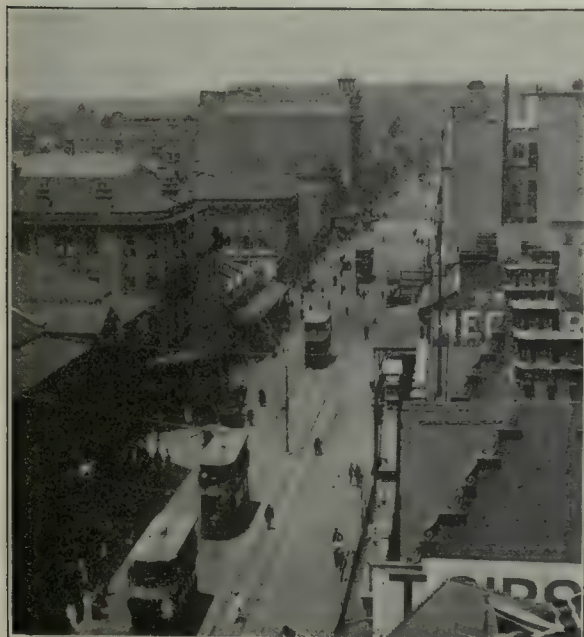
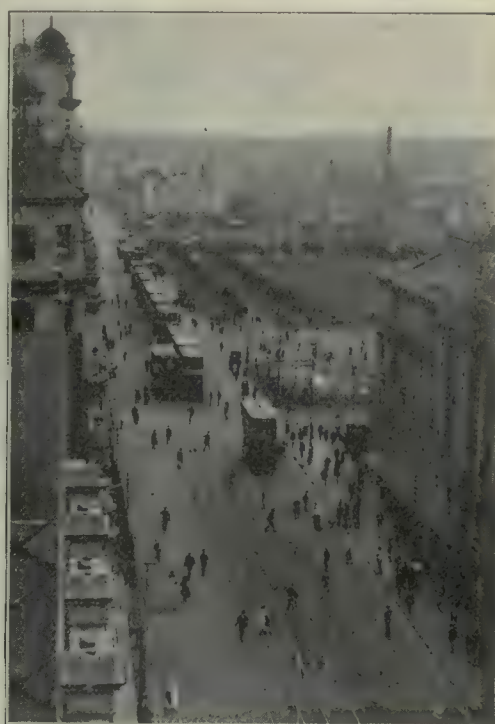
Development in South Africa During the War Has Been Hampered  
as Elsewhere by Lack of Ability to Secure Equipment—  
Municipal Operation on Most Lines

BY M. EDWARD

Johannesburg, S. A.

**T**HERE are a number of efficient and up-to-date electric railway systems in that part of British South Africa known as the Union of South Africa. Horse cars have completely disappeared, but nearly every town with more than 10,000 white inhabitants has an electric railway line of some kind. Nearly all of the South African lines are run partly or wholly by the municipalities or town councils. Cape Town and Port Elizabeth have private companies, but it is expected that the two electric railway companies in Cape Town will soon be municipalized.

Johannesburg, Cape Town, Durban, Pretoria, Port Elizabeth, East London and Pietermaritzburg have trolley systems. Germiston and Boksburg, practically suburbs of Johannesburg, and Bloemfontein, the chief city of Orange Free State, operate trackless trolley cars, but they cannot be said to be a great success. Benoni, a fast-rising city on the Gold Reef near Germiston and Boksburg, has Edison storage-battery motor-buses. Pretoria, the last town in South Africa to give up horse cars, has the best-laid track and the best cars in South Africa. All the Pretoria cars are single-deckers and



THE FIRST VIEW SHOWS A CAR AT PRETORIA—THE JOHANNESBURG SYSTEM, ILLUSTRATED IN THE OTHER VIEWS, USES DOUBLE-DECK CARS





THE OVERRUNNING COLLECTOR IS USED WITH THE TRACKLESS TROLLEY IN GERMISTON, THE UNDERRUNNING COLLECTOR AT BLOEMFONTEIN

most of them are double-truck. But the system in Pretoria is small compared with that of Johannesburg. In Johannesburg all the cars are double-deckers of the English type. The Johannesburg Municipality owns 135 cars and 70 miles of track. The city is very short of cars, having been unable to get them from overseas during the war. An effort was made to purchase some from other municipalities but only Pretoria had any to supply, and these were too long for the curves on the Johannesburg system. The traffic in Johannesburg has increased more than 50 per cent during the last year and scarcity of cars has become such a serious question that the municipality rebuilt some sprinkler cars, no longer necessary because all the roads are tarred now, into passenger cars. The first of these cars was completed in the summer of 1918 and is a credit to the municipal shops.

Tenders are being asked for the building of other cars at the same shops, and twenty double-truck car bodies are on order from America. They will be shipped "knocked down" and will be put together in Johannesburg in a month or so. Nearly 500 men (white) are employed as drivers, conductors and mechanics.

Thirty million people ride in Johannesburg cars every year, and the receipts amount to about \$2,000,000. Fares are on the zone system. One reason for the large traffic in Johannesburg is because there is practically no steam competition. Suburban trains are run by the South African Government Railways but do not serve the thickly populated city areas. They are for the accommodation primarily of the goldmining towns along the 60-mile stretch of reef known as the Witwatersrand.

And this is where some sort of interurban car system is needed. About 250,000 white people and 400,000 natives, mostly mine workers, live along this 60-mile strip of gold mine in many prosperous little cities. At present the only means of getting in from the suburban

towns to Johannesburg is by suburban steam trains that run every half or three-quarter hour. This train service is about as efficient as a steam one could be, but owing to stops every mile no speed can be

maintained. The South African Railways management had a scheme for electrifying this railway, but the war knocked it on the head. In the meantime there is urgent need for some kind of rapid transit service between the various towns. Cape Town has the second largest system in South Africa, but greater competition is met there from the South African Rail-

ways which runs a remarkably good steam suburban system. Muizenburg, a suburb 16 miles away, is reached in twenty-four minutes by express and forty-five minutes by a train which makes sixteen stops during the run.

Cape Town uses single and double-deck cars, and one company, the Camps Bay Company, runs very powerful single-decker cars fitted with air and magnetic brakes on a line that climbs over part of the famous Table Mountain. With the exception of these cars, and a few at Port Elizabeth, there are no electric cars using air brakes in South Africa.

The views on this page show the trackless trolley cars in Germiston and Bloemfontein, to which reference has already been made. In Germiston the over-running trolley is used with flexible cable. In Bloemfontein the underrunning trolley is employed into double trolley poles. Trackless trolley cars are hard on the roads and are not nearly so comfortable for the passenger as cars running on rails. Besides, the ordinary citizen does not understand the reason for a system between the street car and the motor bus. Germiston started the idea, then Boksburg, an adjoining city, and Bloemfontein, the chief city of the Orange Free State, installed these cars.



# Safety Car in Practice

Wisconsin Electrical Association at Milwaukee Meeting Discusses This and Other Live Topics—Raymond H. Smith Elected President

AS LAST WEEK'S issue of this paper went to press the Wisconsin Electrical Association convention was in session at Milwaukee. A partial account of the meeting was given in that issue. The account is completed this week, including abstracts of the presidential address of John St. John, Milwaukee Northern Railway, and the address of Hon. John S. Allen, Wisconsin Railway Commission, both delivered on March 26. On Wednesday evening a joint banquet of the electrical and gas associations was held in the Hotel Pfister, attended by more than 250 members and guests. A number of instructive exhibits were held in connection with the meeting.

At the Thursday session one of the first matters considered was a report by J. B. Sanborne of Milwaukee concerning the activities of the State Legislature with reference to public utilities. He said that a bill to make the Railroad Commission elective rather than appointive had been twice defeated. A bill which has been introduced to abolish the commission and the public utility law must be watched carefully, he said, for if this carries it will leave absolutely nothing to replace the commission form of regulation. A bill has passed the Wisconsin House and Senate to make the fiscal year of all utilities coincident with the calendar year and, to accomplish this, to permit a report covering a period of six months for those utilities whose fiscal year now ends in June.

The first paper read on Thursday was on "The Proper Loading of Distributing Transformers" by Frank A. Robbins, electrical engineer Superior Water, Light & Power Company, Superior, Wis. In it he recommended the use of self-registering thermometers to measure maximum safe temperature of transformers. This was followed by "A Review of Policies of Service Extensions as Laid Down by State Commissions," by A. J. Goedjen, statistician Wisconsin Public Service Company, Milwaukee.

Alfred Alsaker, chief engineer Delta-Star Electric Company, presented an illustrated paper on "High-Tension Outdoor Substations and Switching Equipment." This will be abstracted in a later issue.

The next paper, on "Safety Cars," by H. L. Andrews of the railway traction engineering department General Electric Company, which was abstracted last week, brought out more discussion than any other paper presented at the meeting. An extended abstract of this follows:

## OBJECTIONS TO SAFETY CARS AND THE ANSWERS THERETO

Raymond H. Smith, vice-president Eastern Wisconsin Electric Company, Sheboygan, expressed himself as being so favorable to the safety car that he might be called a "safety-car hound." He made several interesting comments with reference to this car. One was that the trolley stand is ugly and brings criticism from the public. Some other arrangement will be necessary. There is also some criticism of the width and general comfortableness of seats. Mr. Smith

thought that it might be necessary under some conditions to strengthen the car structurally and thus to add more weight. He asked whether the motors were heavy enough to care for this condition. He said that the manufacturers should not insist too much upon acceptance by the railways of an adopted standard which may not be equally applicable in all parts of the country. In this connection he mentioned the possible necessity of double flooring and inside side sheathing in Northern climates.

In replying to Mr. Smith, W. G. Brooks, Westinghouse Electric & Manufacturing Company, said that the margin of safety in motoring with the safety car was as great as, if not greater than that with the ordinary heavier cars. Mr. Andrews followed with the statement that these same motors are used very successfully in four-motor equipment on standard heavy cars. J. B. Sanborne, Milwaukee, stated that the opposition to the safety car before the Legislature initially came as a result of the use of one man on standard two-men cars. It can be summed up under two general complaints: First, due to the fact that one man has to make change and issue transfers as well as run the car the service is slower; second, two men make for much safer operation not only as regards railroad crossings but also because the motorman on a safety car starts his car before he has completed making change, etc. To the first of these criticisms Mr. Brooks replied that a traffic check taken in Wisconsin had showed that with one man in place of two men on the same car and the same line the stops had averaged two seconds less in duration.

## RAILROAD CROSSINGS OFFER NO OBSTACLE TO SAFETY CARS

As for railroad crossings, C. H. Beck, Westinghouse Traction Brake Company, said that no blanket rule by either city authorities or state commissions can cover all railroad crossings. If the same rule is applied to both a switch track in an open suburb and a two or three-track main-line crossing in town, the very purpose of the rule is defeated, for the conductor will think of each as of equal importance and apply the same degree of care (or carelessness) to each. Any railway would be willing to place a flagman at a hazardous crossing. Mr. Beck emphasized the point that any two-man car is under one-man operation while crossing railroad tracks, because the conductor is out on the street. If the safety of the car depends upon one man he will observe the crossing carefully before proceeding.

J. P. Pulliam, vice-president Wisconsin Railway Light & Power Company, Winona, Minn., said that as the "proof of the pudding is in the eating" the safety cars will prove themselves. The railways have stood still and let the automobiles take the business. Now, more and better service must be given and the Birney car offers the solution. John S. Allen, commissioner Wisconsin Railroad Commission, said that the objection



the commission receives repeatedly refers to the width of door opening. The trolley tower is not objectionable and, as far as speed of service is concerned, the Madison Railways are making trips in 8 per cent less time with one man than they did formerly with two. This is due to more rapid acceleration and stopping. In referring to the door opening Mr. Beck said this is one of the main safety features of the car. The narrow door opening insures that the boarding or alighting passenger is always under the observation of the operator. Besides something for him to hold on by is always available. The narrow opening also permits speedier loading and unloading rather than the opposite, because all confusion of passengers trying to go in both directions at once is avoided and rapid fare collection is facilitated.

#### SPECIAL RAILWAY DIVISION OF ASSOCIATION RECOMMENDED

Before adjournment, a committee, previously appointed to consider and make recommendation concerning increased railway activity at the conventions, recommended that the railway and central station meetings be separated and that the railway branch be known as the Railway Division of the Wisconsin Electrical Association. It was further suggested that this organization be subdivided into five committees, as follows: Committee of five members on attendance and program, to include presiding officer, two railway members and two commercial representatives; committee on shops and equipment; committee on transportation; committee on ways and structures, and committee on power and distribution. Each of the last-named four committees would include three members. These committees would arrange for more constructive co-operation in their respective departments to further the interests of the Railway Division.

Continuing the committee report said: "On account of the existing conditions in the electric railway field, we feel it necessary that immediate action be taken and such arrangements made to enable the newly created division of the association to hold annually a two-day mid-year meeting on some one of the member properties, such mid-year meeting to be devoted to a study of the property, with recommendations for improved efficiency, and a complete report to be incorporated in the minutes of the parent association. We strongly recommend that the necessary steps be taken to bring about this end, and feel that the operation of this new division will stimulate interest among the men engaged in the maintenance and operation of electric railways in this State, with marked improved efficiency of all member properties." This recommendation was referred to the executive committee for action.

#### ELECTION OF OFFICERS

Before the convention adjourned the following officers were elected: President, Raymond H. Smith, vice-president & general manager Eastern Wisconsin Electric Company, Sheboygan; first vice-president, W. C. Lounsbury, general superintendent Superior Water, Light & Power Company; second vice-president, A. K. Ellis, superintendent Wisconsin Traction, Light, Heat & Power Company, Appleton; third vice-president, L. R. Boisen, vice-president Ashland Light, Power & Street Railway Company, Ashland; secretary and treasurer J. P. Pulliam, vice-president and general manager Wisconsin Railway, Light & Power Company, Winona, Minn.

## Service Is Supremely Important\*

Wisconsin Experience Proves That It Is Possible,  
Practicable and Profitable to Please  
the Public

BY JOHN S. ALLEN

Member Wisconsin Railroad Commission

THE quality of the service rendered by any public utility is of supreme importance. All bargaining or trading of any kind is done by two parties: a seller and a buyer. The one characteristic in the seller, which is probably more nearly universal than any other, is that of his desire to please. In the instance of a public utility, there are two parties engaged in the business: the seller and the buyer. The seller is the utility, and buyer is the public. It is quite generally felt that public utilities as a rule do not keep before them as prominently as should be done the desire to please.

It is an axiom of business the world over that money cannot be made out of one's enemies. This is even more true in the case of a public utility than in that of the ordinary tradesman. A satisfied public is the first requisite of a successful public utility. A dissatisfied public is a liability to be seriously reckoned with. A good quality of service redounds to the credit of the utility in many ways. However insurmountable the task may appear, the public utility manager has but one major problem, and that is to please the public.

Some operators may answer that it is absolutely impossible to please the public. The files of the Wisconsin Railroad Commission show that it is possible, practicable and profitable. There are many instances in Wisconsin which show conclusively that the public can be very generally and satisfactorily pleased.

Good service can only be defined as a service of such quality that it pleases and gives satisfaction to the buyer. There comes to mind one utility in Wisconsin which conforms very closely to the mathematical concept of the standards of the commission, yet whose service, owing to one curt employee, does not please and give satisfaction to the buyer. On the other hand, numerous instances come to mind where deficiencies in the mathematical standards are more than made up by a painstaking and studious desire to please.

The quality of service is the prime factor in solving all of the problems of a utility in its relations, to the public, to its stockholders or to its employees. The quality of the service has a very important bearing on the volume of business. It has much to do with civic pride, and the resulting attitude of civic bodies very generally controls the attitude of the city attorney and of the city council. Moreover, a good quality of service has a very important bearing upon the size of the dividends and upon the value of the capital stock of a company. As far as the employees are concerned, an improvement in the quality of the service will make the work more congenial and greatly improve the tone of the organization.

The good-will of the public toward an electric railway is determined by two principal factors; namely, the historical attitude of the company toward the public—that is, the things that the company may have done in the past—and the attitude of the present organization toward the public. The attitude of the public toward the company is directly a reflection of the atti-

\*Abstract of paper read before meeting of Wisconsin Electrical Association, Milwaukee, Wis., March 26 and 27, 1919.



tude of the company toward the public. Of this fact I am more and more convinced from day to day. The eternal vigilance of electric railway operators, wisely applied to the quality of the service rendered, will yield larger and more satisfactory returns than any other line of endeavor to which they may apply themselves.

## What the Future Holds\*

**Cost of Living Must Decline Before Wages Drop—  
Operating Efficiency Must Be Preserved  
Despite Costs**

BY JOHN ST. JOHN

Assistant General Manager Milwaukee Northern Railway,  
Cedarburg, Wis.

WITH the signing of the armistice it was generally thought that the cost of labor and materials would decline, but the result has been otherwise. Materials and living necessities have in many cases increased in price. Labor is more plentiful, but the rate of wage remains the same. Before we should expect labor to accept lower wages the high cost of living will have to go down. While it is true that high wages during the war frequently resulted in more extravagant tastes, leaving no margin of savings, yet labor will not subscribe to a plan to reduce wages until a substantial reduction is made in the cost of the things to which it has become accustomed.

Many students of the future are of the opinion that it will take all the work every man and woman in the world is capable of performing for the next twenty years to bring the world back to normal; that the basis for work in the future shall be eight hours of work, eight hours of play and eight hours of sleep, and on this basis the individual can be better maintained both physically and mentally; that homes will have to be built which will be modernly equipped and will fully satisfy the demands of comfort and provide something of luxury; and that appetizing food, good clothes and forms of amusement will have to be provided before satisfaction can be expected from the working class.

We should all like to see these aspirations satisfied. To what extent, however, they may be satisfied depends upon the ability of the employer to maintain his earnings so as to enable him to meet the increased burdens. The prosperity of the employee is essentially involved in the prosperity of the employer. I think we shall all agree that it should be the policy of utilities in the future, as in the past, to maintain, as far as possible, wage scales for the steady and industrious employee which shall be well up to that of other employers of labor for like character of work. Furthermore, I think that the utilities will not be found lacking in their desire to co-operate, in all practical ways, in those things which conduce to the welfare of their employees.

### COAL SITUATION NEEDS EXAMINING

For the last three months most operators have been expecting a reduction in the price of anthracite and bituminous coal. On Feb. 1, instead of a reduction there was an increase of about 20 cents per ton for coal mined in southern Illinois. We now are advised that, beginning with May 1 and continuing for five months, there will be a monthly increase of 15 cents per ton on the domestic sizes of anthracite coal. Then we hear the

talk of closing the mines to avert the danger of possible bankruptcy.

It is true that the government about a year ago urged coal operators to speed up production to supply war requirements and the operators agreed to maintain a high wage scale until such time as peace was concluded. Now with the war over and after an unusually mild winter, the bins of many of the domestic users and the stock piles of the industrial plants are such as to make the demand very small. High wages for mining and other work connected with mining continue to be effective and, with the small amount of coal produced, the cost is very high. Even when the coal is sold at the prevailing prices, which appear to be high, the coal operators advise that a loss is sustained and that in self-defense the mines may have to be closed.

We have no reason to doubt the statements made by the coal operators. We are, however, advised that there are large stocks of coal on the docks of the coal companies and of the government; that the releasing of the government coal would probably result in a reduction in price and that, if such reduction was very substantial, it would cause financial ruin to the coal companies. Since there appears to be a wide range of opinion concerning this subject, I would recommend that railway men analyze the situation very carefully before contracting for their requirements.

### TAXES AND MAINTENANCE

About 14 cents out of every dollar of receipts go toward taxes, and as a good portion of the taxes is to help the government meet the expenses incurred in connection with the war, we cannot expect very much relief in federal taxes for some years to come. As to local and state taxes, I am not prepared at this time to state which method of taxation is the most equitable, but I believe that the basis for taxing one utility should be the same as that applied to another. I know that the utilities of Wisconsin desire to pay their just proportion of taxes, but such proportion is to be determined by the amount paid by the other taxpayers of the community in which they operate. If the valuation of the utilities is to be determined by the tax commission by capitalizing net earnings, then the rate of capitalization should be the same in all cases and should not be less than 8 per cent.

As regards maintenance, my recommendation is to keep plants in an efficient operating condition by proper maintenance regardless of prevailing costs. Do not put off until to-morrow that which should necessarily be taken care of to-day. The old adage of "penny-wise and pound-foolish" may sometimes be applied to the way we maintain our equipment. Of course, extraordinary maintenance may be deferred, but only so long as it does not impair operating efficiency or decrease the quality of service. The consumer is not much interested in the cost of labor and material or the efficiency gotten out of either or the technics or financial problems of the business. He wants adequate and reliable service which is standard in quality and of good regulation, at reasonable rates. Adequate service means that which is standard in quality and of good regulation. Reliable service is adequate service that may be had at any and all times—whenever it is desired. Reliable service is dependent upon adequate service, and both should be potent factors in determining reasonable rates.

\*Abstract of president's address before meeting of Wisconsin Electrical Association, Milwaukee, Wis., March 26 and 27, 1919.



# Skip-Stop Results in Toledo

Automobile Accidents Decrease in Spite of Increase in Machines Registered—Other Striking Evidence of Greater Safety of Skip Stops

By A. SWARTZ

Vice-President Toledo & Western Railroad and Assistant Manager of Railways, Toledo Railways & Light Company, Toledo, Ohio

POSSIBLY one of the greatest economies that has resulted from the introduction of skip stops on the lines of the Toledo Railways & Light Company is the reduction in accidents of all classes, in which the public at large were concerned.

On Aug. 13, 1917, the skip-stop system was installed on the Cherry Street line for a tryout. On Oct. 1, 1917, it was installed on the Summit-Broadway line. The result in both cases was an immediate reduction in accidents on these lines. The company thereupon decided to install the system on the three belt lines, which was done on Oct. 13, 1917, and was attended with the same results. On Jan. 1, 1918, four more lines were added to the list, making a total of nine out of sixteen lines operating with skip stops. The result can be seen by referring to the accompanying charts. On April 1, 1918, the remainder of the lines of the system were added to the list. The actual figures are given in the table, which shows that one of the principal items in the accident list, collision with automobiles, has undergone a very remarkable and continued decrease, in spite of the increasing number of machines and reckless drivers. The figures for registered automobiles, it should be added, do not include the daily average of forty army trucks and cars being driven through Toledo during the greater part of the year

It will be seen from both the table and diagrams that there was a noticeable decrease in both total accidents and automobile accidents beginning with Jan. 1, 1918,

when nine out of the fifteen lines were operating under skip stops. This is all the more notable because with the installation of skip stops there came a rearranging of schedules, the result of which was a shortening of time allowed for each trip and a layover of from three to four minutes per trip. This, of course, necessitated operating at a higher average schedule speed, amounting to a 10 per cent increase in miles per hour.

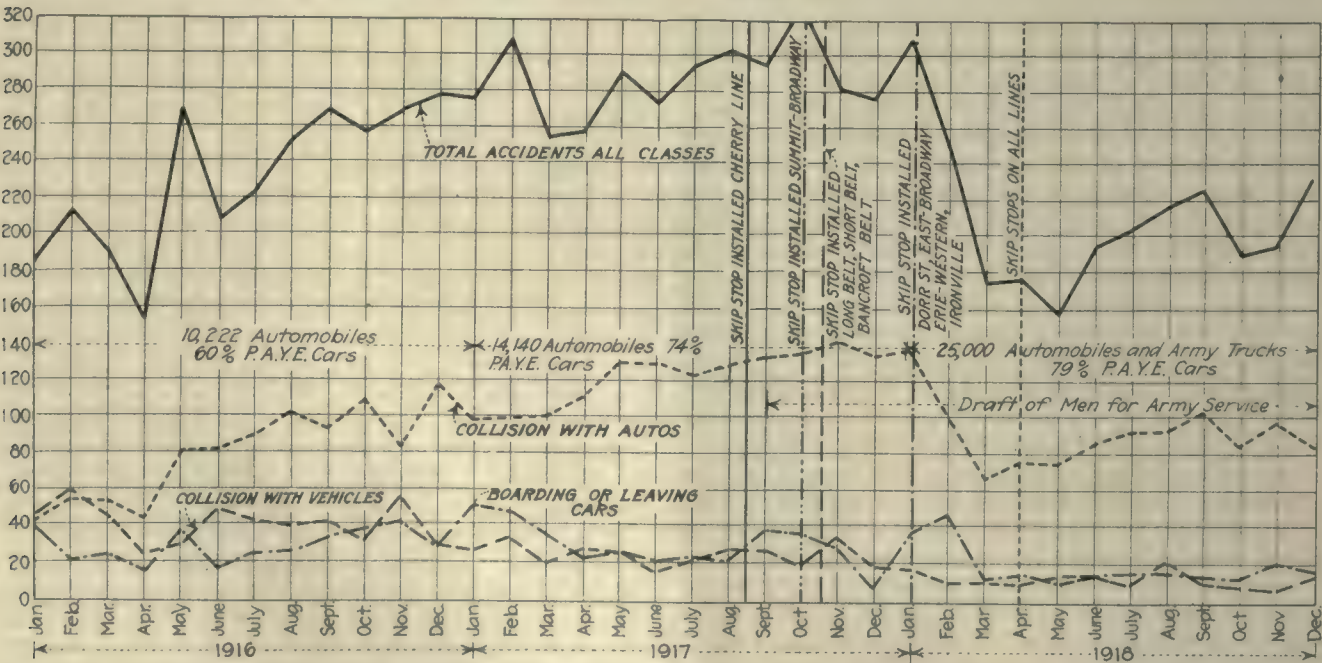
The decrease in accidents with non-motor vehicles is also considerable as will be noted by referring to the chart below. The total non-motor vehicle accidents for 1916 was 369. For 1917 it was 384, an increase of 4 per cent and for 1918 it was 245, a decrease of 36 per cent under 1917 and 34 per cent under 1916.

This decrease we do not ascribe so much to skip stops as to education, as non-motor vehicle accidents occur in nearly all cases in that part of the city where skip stops are not in vogue, namely the congested district.

TABLE SHOWING REDUCTION OF ACCIDENTS BY SKIP STOP IN TOLEDO

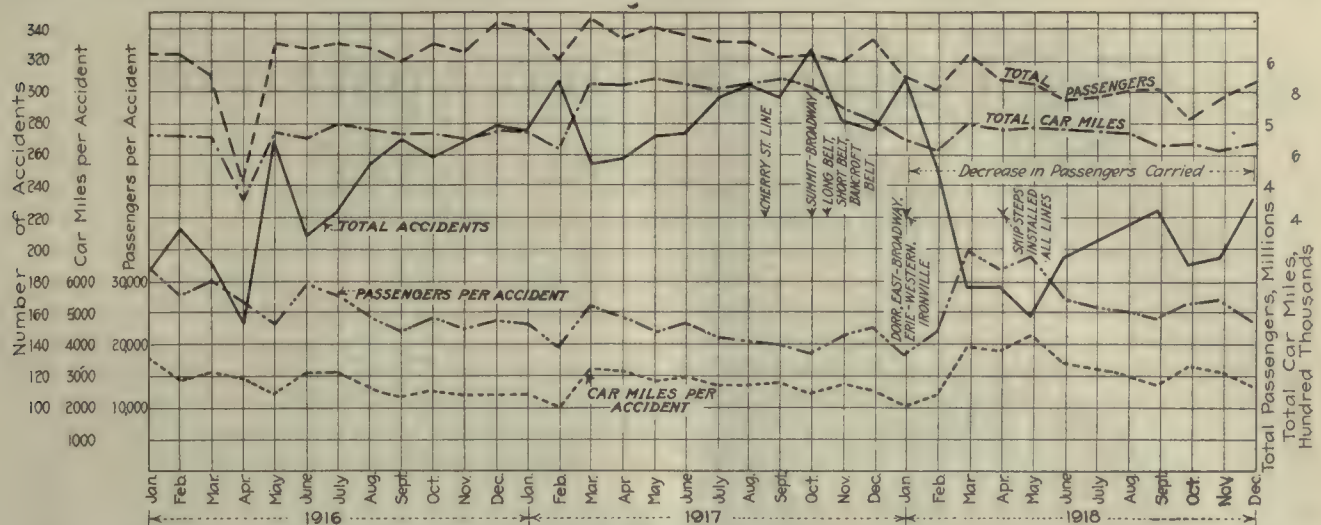
	1916	1917	1918
Total number of accidents.....	2,779	3,442	2,540
Number of licensed automobiles.....	10,222	14,140	25,000
Total automobile accidents.....	976	1,487	1,126
Percentage automobile accidents to total.....	32	43	44
Increase in number of licensed automobiles over previous year, per cent.....		38	77
Increase in number of licensed automobiles over 1916, per cent.....			144
Increase in automobile accidents over previous year, per cent.....		52	*24
Increase in automobile accidents over 1916, per cent.....			15

\* Decrease.



THIS CHART SHOWS TOTAL ACCIDENTS, AS WELL AS NUMBER OF AUTO-COLLISIONS, COLLISIONS WITH OTHER VEHICLES AND ACCIDENTS FROM BOARDING AND LEAVING CARS





THIS CHART SHOWS VERY CLEARLY THAT WITH THE USE OF THE SKIP STOP THERE HAS BEEN AN INCREASE IN SAFETY OF OPERATION IN TOLEDO

At the same time that skip stops were installed, a more rigid discipline system was started. All employees concerned in accidents are called in to the office and dealt with as the case demands.

A very marked rise in accidents will be noticed as beginning in June, 1918, when the effects were felt of the first draft, which necessitated the employment of younger and inexperienced men. However, no man under twenty-one years was accepted as a motorman. Still, the total accidents for the year were 26 per cent less than in 1917. For the seven months of June to December inclusive the accidents totaled 1466 as compared with 2054 during the corresponding months of 1917, a decrease of 23 per cent, thus showing that education and watchfulness of new men were effective in securing the desired results.

It may here be noted that accidents of all kinds, including those concerning the public and all employees, were reduced 26½ per cent in 1918 over 1917.

#### STATISTICS PER ACCIDENT QUOTED

Reference to the second chart discloses that "total passengers carried" and "car-miles operated" started to drop about May, 1917. At the same time, passengers and car-miles per accident instead of increasing also declined until the advent of the skip-stop system, when these lines show a steady rise. It also will be noticed that these last two lines show a further decline about June, 1918, at which time the effect of the first draft was felt in our ranks.

It is very gratifying to note that in no month of 1918 was the total number of accidents equal to even the lowest monthly record of 1917.

The extremely low point reached in April, 1916, was when the system was closed for thirteen days on account of a strike. This same low point was reached in May, 1918, with an increase of about 33 per cent in car-miles operated and of about 25 per cent in passengers carried. While the number of lawsuits cleared up in a year warrants only a general comparison with any other year it was very gratifying to note a saving of about 40 per cent in the claim department expenses for 1918 over 1917.

Boarding and leaving accidents during 1916 totaled 518, and during 1917 there were 320 or a reduction of 38 per cent. During 1918 there were 161, a decrease of 50 per cent under 1917 and 69 per cent under 1916.

This has been due largely to the installation of pay-enter equipment, as the percentage of our cars which were pay-enter during 1916 was 60. During 1917 about 74 per cent were pay-enter, and during 1918 about 79 per cent. However, the installation of the skip-stop system, together with our accident prevention campaign, has helped materially in the reduction of this class of accidents.

It should be borne in mind that this company is very insistent in requiring accident reports for everything that happens. In the case of car collisions, if the fender of one car simply rubs or strikes another car we report it as a collision so that we may apply the proper discipline in all cases.

#### Motorwomen Operate During Blizzard



TELEPHONE STATION AT END OF LINE

THE biggest blizzard of the winter, which occurred on Feb. 28, was a test for the motorwomen on the Charles City (Ia.) Western Railroad car line. The girls stood the test excellently. They had a walk of 1 mile before 6 a. m., the starting time, to get to their cars, with unshoveled walks and against a high wind. Their variation from the regular time schedule was only fifteen minutes for the entire day. At one end of the line there is a deep cut that drifts badly but the snowplow was kept busy all day clearing the tracks. The girls said it was harder to run their cars during a previous heavy snow storm than during the blizzard. They said they really didn't mind the blizzard much.

Seats are soon to be installed for the girls so that they will not be obliged to stand the entire time as they do now. The cars are the safety type. At each end of the line are telephones from which the girls telephone their arriving time to the head office on every run made.

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# The Public Is Too Apathetic<sup>\*</sup>

**The Public Must Meet the Cost of Service to Avoid Receivers—  
Would Mean Ultimately Poor Service—Courts Cannot Borrow  
Any More Than Companies Unless Better Security Is Offered**

By CHARLTON OGBURN

Examiner in Charge of Electric Railway Department  
National War Labor Board

**T**HE City of Denver is to be congratulated for adopting such an intelligent plan in meeting the traction situation. Its mayor has appointed a committee of representative citizens, which will receive whatever information it can get upon this subject and report its findings. In other cities I have found a good deal of apathy toward the crisis in electric railway conditions prevailing over the entire country. It would be splendid if every city in the United States could follow the lead of Denver in this regard.

## WAGE INCREASES A MATTER OF JUSTICE

The War Labor Board has increased wages generally of electric railways throughout the country. That has been done as a matter of justice. P. H. Gadsden has estimated that the War Labor Board has increased the wages of the employees by \$100,000,000 per annum. Our own estimate is \$25,000,000. It by no means follows that this increase, in large part, might not have come about had the War Labor Board had nothing to do with it, for wages had to increase.

The guiding principle which led the War Labor Board and similar government bodies to fix certain wages was the standard of living. Before the war the standard of living for the American working man was low; it was certainly none too high. The members of the various boards felt that during the war the standard of living should not be still further lowered. Therefore, it became necessary to determine upon a wage scale which would at least keep the standard of living up to what it had been before the war.

The facts upon which the War Labor Board based the standard of living were gathered by a series of surveys and studies made all over the United States by various agencies. The board had its own cost-of-living department, which independently made studies and surveys of what the cost of living was in various cities of the United States. The net result ascertained was that the cost of living to-day is approximately 65 or 70 per cent more than it was in the fall of 1915—that is, a wage earner in the fall of 1915, who was making 30 cents an hour, ought to-day to be making at least 50 cents an hour in order that he might make just as much as he had been making in the fall of 1915.

The War Labor Board figured out that there are certain things a working man's family must have. It determined the annual budget needed for a family of five persons, husband and wife and three children. It provides, for instance, only \$76 for the man's clothing, only \$55 for the woman's clothing and only \$180 for rent. A total of \$50 is provided for recreation. There are certain other small items—e.g., laundry, \$4 and paper and books, \$9. The total comes to \$1500

for the year. In other words, a working man with a family of five must make \$125 a month to make a living wage.

## THE PUBLIC SHOULD PAY FOR ITS SERVICE

All of the earnings of an electric railway of course have to come from the public, because the company sells its product to the public. We felt in doing the justice we were doing to the men, we should not do an injustice to companies. We therefore incorporated in the Denver and some other awards a recommendation to the public authorities, the public commissions or the municipal authorities, that the companies be allowed to charge what additional increase in fare they needed to pay the awards. What increases in fare were needed, was a matter for these authorities to determine.

The joint chairmen of the War Labor Board have felt the matter as keenly in other cities as they have in Denver. They have written letters to the municipal authorities and to public service commissions. In Memphis the board made a study of the cost of living, found it had increased 42 per cent and raised the wages 42 per cent. We then recommended to the city that the company be allowed an increased fare to meet it. Here is the letter which Mr. Taft later wrote to the City Council:

We are advised that your honorable body has not as yet advanced the rates on the street car line of Memphis in accordance with our recommendation. We recognized the probable inability of the company to pay the increase in wages which we gave, unless the city granted an increased fare to the company. Our award was a balanced one, in the sense that had we had the power, we would have ordered an increase in the rates of fare at the same time that we ordered an increase in the rates of wages.

The people of Memphis should pay war prices for transportation just as well as for coal and for food. They cannot hope to escape this burden that we all had to bear by reason of the war. It is not fair that the public should take advantage of a public utility company and hold it down to an anti-war contract in that regard. We should think that the equity of the company in this matter should appeal to the fairminded people of Memphis and to their representatives in your honorable body.

The company has applied the award as to wages, but if as we are advised, it is likely to go into the hands of a receiver, you will find ultimately poor service. The theory that a court can run an electric railway by issuing receivers' certificates, when the company will not pay its operating expenses or much more than that, is likely to be exploded by the results of any such experiment. Courts can not borrow money any better than companies, if they cannot give better security, and public utilities securities in the present juncture are worth nothing as collateral.

The City Council of Memphis declined to take the advice offered by Mr. Taft. The company now is in the hands of a receiver.

Now, in a nutshell, the requirements of this company, and any company, to meet the wages awarded during the war is simply this: The 5-cent fare which the company in 1915 charged amounts only to 3 cents now in its purchasing power. This company cannot take

<sup>\*</sup>Abstract of address delivered before recent meeting of citizens' adjustment committee, Denver, Col.



5 cents and buy more than 3 cents worth of goods based on the 1915 prices. Therefore, if this company is to charge the same fare that it charged in 1915, it must be allowed to charge an 8-cent fare, because 8 cents now, in its purchasing power, equals 5 cents in 1915. This company, I understood, is not asking for 8 cents but for only 7 cents.

WILL THE PUBLIC MEET THE TEST?

This electric railway situation affords an interesting psychological study of the public as to how it will meet the test, which it must face, as to whether it will be fair to these public utilities. I have heard the cases of the men and the companies for more than eighty electric railways, including nearly all of the important lines in the United States. I know the situation that faces them.

The electric railway industry of the United States is very nearly bankrupt. Here is a calamitous situation facing this country as a whole, less important possibly than the steam railroad situation, but presenting an absolutely vital problem. Electric railways are going into the hands of receivers, but they are absolutely essential. If it had not been for their work in carrying war workers to and fro, the work turned out by the factories would have been greatly hampered. Electric railways are essential to the growth, to the health and to the progress of any community.

A suggestion which has forced itself on my mind in my study of the electric railways is that the present basis of fare is not just. The railways, regardless of their past history, are giving too much for the money. We do not like to say that anybody is giving us too much for our money, but that is the case. The other day I was in a city where one could ride 18 miles for a nickel. It might be said there are lots of short hauls that would make up. That may be true, but probably the best method of remedying the situation is by some system of zone fares. That is being given a good deal of study.

Another thing has impressed itself on my mind, i.e., that the electric railways themselves want their franchises adjusted, and they want this adjustment in co-operation with the public. That is the only way it ought to be, in co-operation with the public utility bodies, in co-operation with the city councils. It ought not to be done in any spirit of antagonism to the public and these councils, but previously for what is best for the community.

I hope the Denver committee will study in all of its aspects what has been adopted lately in several cities—the service-at-cost plan. I have had occasion to see its workings in several cities. I know how well it works. The plan is fair to the public and fair to the company, because it is based on a certain appraised valuation of the property of the company made by the public and the company. There is no over-appraisal or under-appraisal. The plan allows the company to charge a fare that will pay the actual cost of operation, including a fair return on the investment. I think that Denver could wisely study the results of such a plan.

Smoking has been customary in suburban cars in Japan although prohibited in city cars. On Feb. 1, 1919, however, the Imperial Government Railways inaugurated new regulations prohibiting smoking in suburban cars.

Making Casual Riders Pay

Manager Proposes Sale of Annual and Monthly Pass Cards Permitting Daily Riders to Ride at 5 Instead of 10 Cents

THE application of the commutation principle to electric railway fares, so as to lessen the rate as the rides per month or per year increase, is discussed in an article contributed to the *Wall Street Journal* by R. Schaddelee, vice-president and general manager United Light & Railways Company, Grand Rapids, Mich. He believes that the public, when it understands the fairness of the system proposed, will welcome it as a very desirable improvement.

Under Mr. Schaddelee's plan the regular cash fare would be 10 cents, but anyone could pay \$6 for an annual card entitling him to ride for 5 cents per ride as often as he desired. The pass card for 1919, for instance, would be of a distinctive color and have the figures 1919 prominently printed over its face. It would be sold at \$6 during January, \$5.50 during February, \$5 during March, etc. Similar pass cards could be sold at 50 cents each and would be good for only one month. The passes would be non-transferable.

Anyone using the street cars not more than ten times a month would have no object in purchasing either a yearly or a monthly pass card. The following table shows how the average cost per passenger would be reduced as the number of rides taken per month increased:

COST OF RIDE TO PASSENGERS UNDER PASS-CARD SYSTEM					
Number of Rides per Month	Cost of Monthly Pass Card	Cost of Cash Fare (10 Cents per Ride)	Cost of Cash Fare (5 Cents per Ride)	Total Cost	Average Cost per Fare in (Cents)
5	.....	\$0.50	.....	\$0.50	10
10	.....	1.00	.....	1.00	10
15	.....	.....	.....	1.25	8 1/3
20	.....	.....	.....	1.50	7 1/2
25	.....	.....	.....	1.75	7
30	.....	.....	.....	2.00	6 2/3
35	.....	.....	.....	2.25	6 1/4
40	.....	.....	.....	2.50	6 1/5
45	.....	.....	.....	2.75	6 1/6
50	.....	.....	.....	3.00	6
60	.....	.....	.....	3.50	5 2/3
70	.....	.....	.....	4.00	5 1/2
80	.....	.....	.....	4.50	5 1/4
90	.....	.....	.....	5.00	5 1/5
100	.....	.....	.....	5.50	5 1/6

Some of the advantages of this pass-card system, according to Mr. Schaddelee, are as follows:

When this system supersedes a flat 5-cent fare, the occasional rider pays an increase of 100 per cent; the passenger who rides twenty-five times a month, an increase of 40 per cent; one who rides fifty times a month, an increase of 20 per cent, and one who rides 100 times a month, an increase of 10 per cent. This system would do away with the handling of pennies altogether. A passenger would either pay a nickel fare or a dime fare. Every passenger not showing a pass card to the conductor would pay a 10-cent fare.

Every passenger would be entitled to the usual transfer, although this system could easily be adapted to a separate charge for transfers by charging 25 or 50 cents a month extra to passengers desiring a monthly pass card entitling them to nickel fares with free transfers. In that case these cards would have a different color and have "Transfer" printed prominently on their face.

There would undoubtedly be some misuse by owners losing their cards or allowing other people to use them, but this would be negligible. Every system of fare collection has some loopholes, and this scheme would have fewer than any other scheme.

Passengers should deposit their own fares in the fare box, the conductor merely seeing to it that every passenger not having a card should deposit a dime. The conductor would handle no fares or money except to make change. He would have no punching to do.



This scheme would also work out well with one-man car operation. One glance at the card is all that would be necessary to determine whether it was genuine.

The passenger, once having paid his 50 cents for the monthly pass or his \$6 for the yearly pass, would undoubtedly be more likely to ride and reduce his average cost. The riding would thus be stimulated, and the cost of the service would be more equitably distributed than under any straight-fare system.

In Mr. Schaddelee's opinion, it is the large number of working people, and medium and small-salaried people, who depend upon the street car system entirely as their daily mode of local transportation, that make it possible for the automobile owners and other classes of people, who use the street car service only as a matter of occasional convenience to themselves, to have street car facilities available at all. This is the defect of any straight-fare system. The annual pass-card system is designed to remedy this defect by placing more of the cost of operation upon the casual rider and less upon the daily rider.

## Traffic Characteristics

### A Simple Graph Designed to Visualize The Relationship of the Supply and Demand of Service

BY JOHN A. DEWHURST

THE charts presented herewith illustrate a method of visualizing graphically the relation of the service furnished on a car line or route to the demand for service.

The charts are prepared from data observed at definite points on the line and represent the adequacy of service at that point. In the case of the charts accompanying this article, the points of observation are maximum-load points previously determined, and hence represent the adequacy of service for the entire line, assuming, of course, that the short-line possibilities are satisfactory.

To prepare a graph as represented, the line to be studied should be checked for several days (not necessarily consecutive days) in order to obtain a typical condition for that particular season of the year. The average number of passengers riding per day in fifteen-minute periods should be calculated from the traffic data thus obtained and plotted on the chart. In the illustrations accompanying this article this passenger record is represented by the solid line.

Likewise, the average number of seats offered during the same periods should be calculated in a similar manner (number of cars passing the point of observation times the average seating capacity). These average daily fifteen-minute totals are then plotted as shown by the dotted lines.

The areas shaded depend upon the relationship of these two lines with respect to each other. When the passenger "Service Demand" curve is in excess of the seats furnished or the "Service Supply" curve, the area is shaded with double cross hatching, indicating passengers standing. In portions of the chart where the supply of seats is greater than the passenger demand, the area is shaded with dotted-line hatching indicating empty seats. Then the area shaded in single solid-line hatching would indicate passengers accommodated with seats.

Chart 1

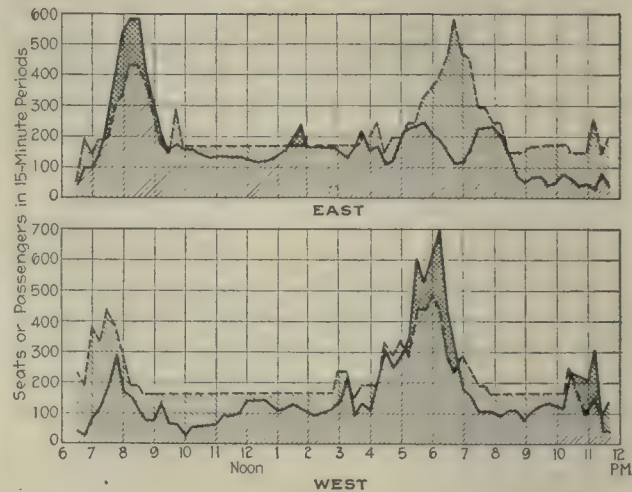
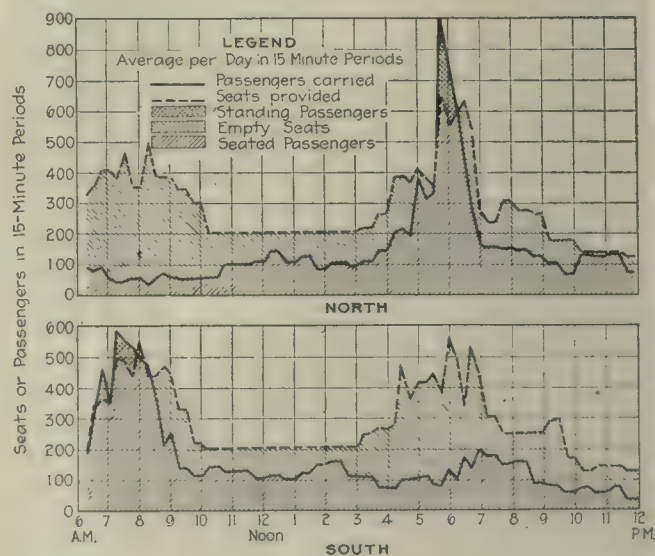


Chart 2



CONVENIENT METHOD OF CHARTING SERVICE—THE UPPER CHART SHOWS BETTER PLANNING THAN THE LOWER ONE

Under ideal conditions of a seat for every passenger and a passenger for every seat, the solid lines and the dotted lines would coincide, and the entire area would be shaded with only solid-line hatching. Unfortunately, such conditions do not prevail.

By means of a series of such charts the management can, however, endeavor to keep down the area representing empty seats, especially during portions of the day at which more than the basic service is provided. At the same time the area representing standing passengers can often be regulated so as better to serve the requirements, oftentimes without additional expense.

#### THE CHARTS SHOW ACTUAL CASES

Both of the charts presented illustrate the actual conditions existing on lines of large properties in the United States. The first one is selected as typical of well applied service. The peaks in service correspond to the peaks of travel demand and show a minimum of wasted service.

The second chart illustrates poorly applied service. For instance, during the morning rush hour southbound the peaks in seats furnished actually occur three quar-



ters of an hour after the peak in travel, and the travel is even so low that sixty empty seats are operated during fifteen minutes of the peak, a service, which, of course is most costly to provide. The entire tapering off of the rush hour is from thirty to sixty minutes later than it should be. Likewise, at night the tripper service northbound starts at 3.45 o'clock, whereas the passengers riding would not occupy all of the base headway seats until an hour later, or at 4.45. There also occurs at 6.30 a minor peak of seats that are empty. Even after the tripper service is off at 7 p.m., up to 9 p.m. there are 25 per cent to 50 per cent more seats operated than during the middle of the day, whereas the travel would not even occupy the seats that would be provided by the base headway alone.

#### OTHER USES OF THE CHARTS

If the charts are analyzed still further it will be observed that the area under the dotted line (service furnished) is "Seat-Hours" which, with the introduction of a constant, can be converted directly into car-miles. In other words, the area outlined by the dotted line bears a direct relation to car-miles operated or the entire expense of operating the line.

To illustrate the application of this point, if a company desires to obtain approximately the relative cost of operating a new schedule, the proposed seats to be furnished passing the maximum-load point should be plotted on the graph and the respective areas measured with a planimeter. The ratio of the respective areas multiplied by the car-miles of the existing schedule would give an approximate indication of the mileage of the proposed schedule, providing no pronounced change were made in routes or short-line cars, as this scheme assumes the same average length of trip.

Graphs of this nature are simple to construct from data that should be collected continuously. Where records of this kind are kept different colors are used for the different areas instead of shading, the shading having been substituted in this article only on account of the difficulty in reproducing colors.

It is suggested that the line representing passengers be drawn in black, the line representing seats in red and the areas colored in red for standing passengers, in green for empty seats and in blue for passengers accommodated with seats. The charts then stand out in a very striking manner and not only illustrate very characteristically to those familiar with such data the conditions of a line, but also serve to illustrate to a layman facts that otherwise are hard to present. For instance, it is very apparent that the numbers of passengers required to stand during the rush hours are remarkably small in the average case compared to the number of empty seats that are operated on nearly every line during the off-peak hours. Charts of this kind have been found to be of great help in presenting the traffic problem to regulating bodies that often are not familiar in detail with the usual operating conditions.

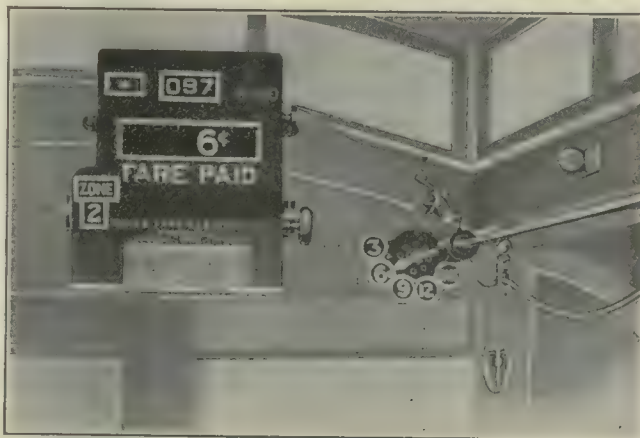
It is not advocated that all traffic records should be worked up as extensively as outlined in this article, but it is of great help to build up such a picture of the traffic characteristics of all lines, say at least once or twice a year, at the times when they represent typical conditions.

## Zone Fare Registering Machines

### Recording Fare Register and Identification Check Issuing Machine Recently Developed

THE Ohmer Fare Register Company has recently developed a register for zone fare collections. In one form for small properties, the register is largely an adaptation of the company's standard form, the principal difference being that it carries a zone indicator. One of these registers, designed for five rates of fare, is shown in the accompanying illustration. The records made by this register are as follows: The zone number, the trip number, the direction, the division or line number, five columns showing the registration of each kind of fare, the register number, the total number of passengers carried, the date and the conductor's identification number. The distinctive difference between this register and the company's latest city register, as already explained, is the indication on the front of the register of the zone number and its record on the printed report.

To take care of the collection of zone fares on large city and interurban properties a modification of this register has been developed together with a zone check printing and issuing machine where identification checks are given on the front platform, as with the proposed



ZONE FARE REGISTER FOR FOUR ZONES

Public Service Railway zone system. In the register the fare indicator is set rapidly and accurately by setting a lever to the desired fare on a dial on the side of the machine. The fare is then registered by a treadle. The capacity of the machine is from 1 cent to 99 cents. As the end of each zone is reached and a new zone entered, the conductor takes a print and thus makes a record of all fares collected in the previous zone. At the same time, the visible zone indicator in the register advances progressively to show the number of the zone just entered. This movement is automatic and the zone indicator cannot be turned back until the complete number of zones on the line has been reached. The records made cover, besides the usual ones, the total number of free tickets, total number of purchased tickets and total number of transfers. This record is made for each zone.

The register is mounted on a pedestal and can be carried easily from one end of the car to the other. Its weight is 65 lb.

The identification check-issuing machine will print and issue, one at a time, a check showing the number of the zone in which the passenger boarded the car,



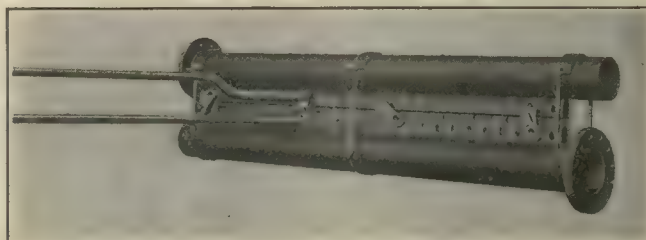
the direction in which the car is moving, the serial number, the date, month and year, the motorman's identification number, the serial number of the machine and other information. The machine cannot be operated until the motorman's identification key is inserted. The zone number is set by a lever which simultaneously rings a tell-tale bell and also sets the visible zone indicator. The ticket is printed and issued by the motorman pressing his foot on a pedal, or it can be operated by a hand lever. Tickets can be issued at the rate of 60 or 70 to the minute. The weight of this machine is 35 lb.

## Superheater that Can Be Applied to Existing Boilers

**The Connection Between the Tubes and the Heater Is Made by Means of a Ball and Socket Joint**

**T**HE following points have been kept in mind by the engineers of the Locomotive Superheater Company, New York City, in designing a new type of superheater for use in stationary power plants: (1) Safety; (2) accessibility for inspection and repairs; (3) protection against overheating; (4) high superheating efficiency; (5) improved efficiency of combined boiler and superheater; (6) consideration of steam velocities and areas to provide minimum drop in steam pressure; (7) uniformity of superheating and ease of regulation; (8) provision for expansion and contraction; (9) provision for cleaning; (10) minimum possibility for leaks; (11) flexibility and adaptation to different designs of boilers.

The general plan of the superheater is shown in the accompanying illustrations. It consists of two headers, one of which is the distributor for the saturated steam coming from the boiler and the other acts as the col-



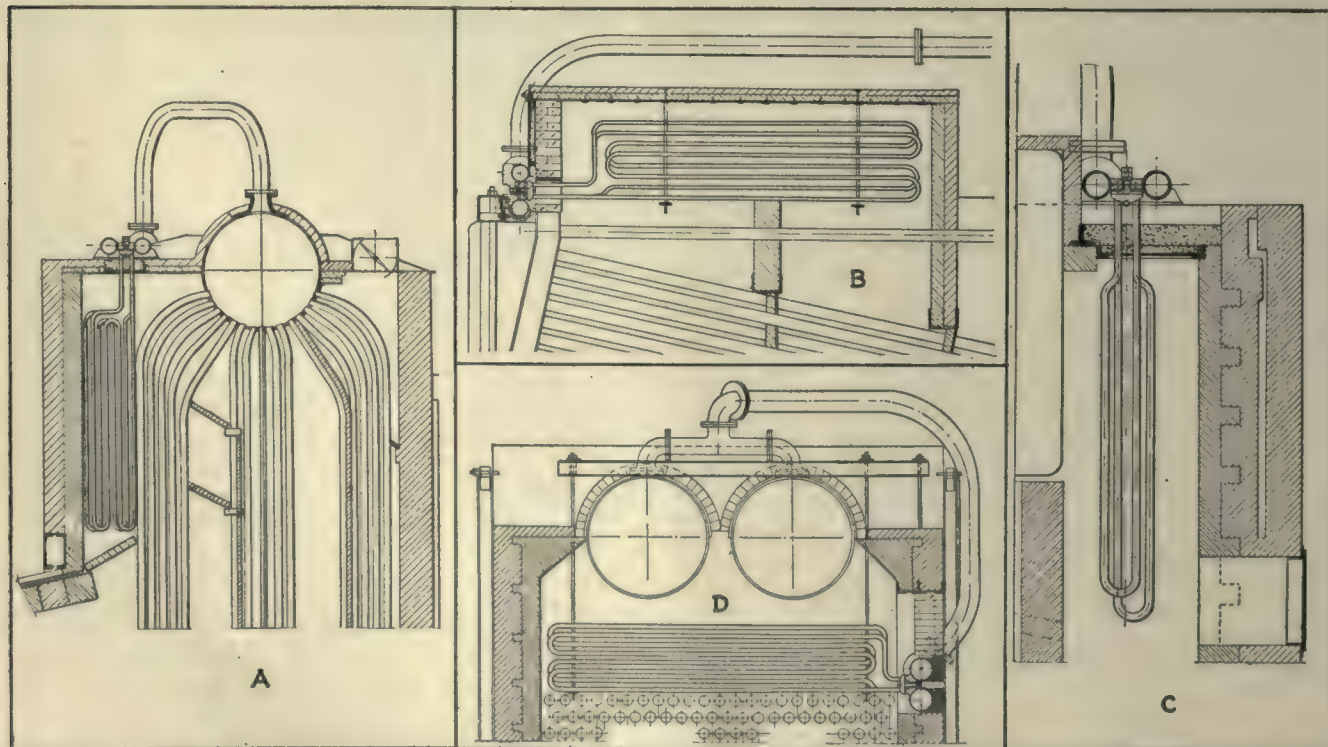
SUPERHEATER HEADER SHOWING METHOD OF ATTACHING UNITS

lector of the superheated steam. The headers are of steel and are located outside of the hot gas path, usually outside the boiler setting proper.

The superheating units are of heavy cold-drawn seamless steel tubing, bent in such form as to provide freedom for expansion and contraction. They are connected to the headers by means of ball-and-socket joints with ground surfaces. The ball of the joint is forged on the end of the tube, and it is faced and ground. It fits into a ground seat in the header made at an angle of 45 deg. The ball and seat are held in close contact by means of clamps, bolts and washers.

The drawings reproduced below show not only the general construction of the superheater but also illustrate some typical plans for installing it in boilers of usual forms.

A recent bulletin of the National Safety Council calls attention to the danger of accidents from incorrect handling of wrenches, evidently a prolific source of injuries to men in shops. The bulletin contains this trenchant statement: "Pulling away from the open end of a monkeywrench or an 'S' wrench is like attempting to hold your weight on a bar with one finger. You can hold on if you have the strength; so can the wrench if it has the strength."



SUPERHEATERS INSTALLED IN BOILERS OF SEVERAL TYPES: (A) VERTICAL WATER-TUBE BOILER; (B) CROSS-DRUM TYPE BOILER; (C) HORIZONTAL RETURN TUBULAR BOILER; (D) HORIZONTAL WATER-TUBE BOILER



# Getting More Life from "K" Controller Segments and Contact Fingers

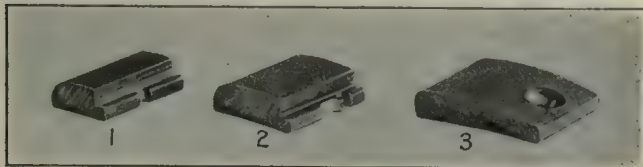
Renewable Arcing Tips for Contact Segments Reduce the Expense of Replacement, and Careful Adjustment of Fingers Increases the Life of Contact Parts

By R. S. BEERS

General Electric Company, Schenectady, N. Y.

WITH a "K" controller the most severe duty is on the contact fingers and segments, and for this reason they require the most attention. It is essential for satisfactory operation that the contact surfaces of the fingers and segments be smooth. This means frequent inspection, as the arcs broken in the controller burn the lubricant and roughen the segments and fingers. The burning takes place when the finger and segment break contact and is more pronounced at the end of the segment. On account of this it is often necessary to replace a segment that shows wear only at the end. To reduce the expense of such renewals, railway controllers designed in recent years have a removable "burning tip" as part of the segment. These tips are used only with the segments subjected to burning.

Figs. 1, 2 and 3 show three general types of burning tips. That shown in Fig. 3 has proved the most satisfactory. Burning tips of this type, with a suitable segment, may be put on a controller cylinder in place of



FIGS. 1, 2 AND 3—ARCING TIPS FOR DRUM TYPE CONTROLLERS

those of the Fig. 2 type without change in the drilling of the segment screwholes in the controller cylinder. If the controller has the short Fig. 1 type of burning tip it is necessary to drill and tap new segment screwholes before a Fig. 3 type of burning tip can be used. The older types of railway controllers, as the K-6, K-10, K-11, K-12 and K-28, have never been provided with burning tips. To use them would require a considerable relocating of the segment screwholes and a possible modifying of the body casting in order to provide sufficient material for tapping the segment screwholes.

When a new burning tip is put on a controller cylinder with an old segment, the surfaces of each should be made nearly the same height, so that the finger will slide easily from one to the other. If the burning tip is on a segment that engages with a finger when turning from the "off" position to the first point, it is important to have it very nearly the same length as the other burning tips engaging at this time. Otherwise, when the controller is turned off, the burning will be localized on the one with the shortest segment instead of being distributed over several fingers.

The function of a "K"-controller finger is to supply a flexible connection between the segments and the finger base. With the earliest "K" controllers, when cars and motors were of small capacity, this was accomplished with a finger consisting of a copper contact piece riveted

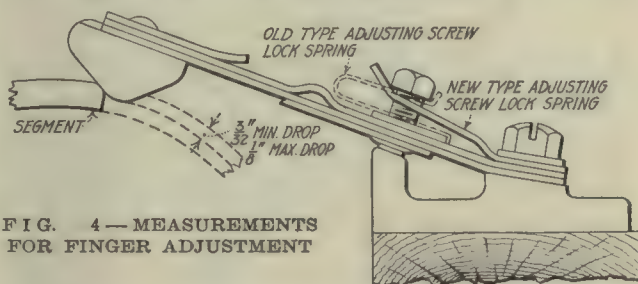


FIG. 4—MEASUREMENTS FOR FINGER ADJUSTMENT

to a flat phosphor-bronze spring. The latter provides the requisite flexibility, presses the contact piece on the segments firmly enough to insure their making good contact and conducts the current from the contact piece to the finger base. As electric cars increased in size and their motors in capacity, shunts were added to the fingers to carry the increased current. Since the shunt is used to increase the current capacity of the finger it is self-evident that the contact tip should make good contact with the shunt and finger spring, otherwise heating and burning will take place where they join. Although the usual method of insuring this is to rivet the parts together, there are two other methods which are used. One is to replace the rivet with a machine screw; the other is to use spring pressure alone to hold the parts together. With these two types, the contact tips may be changed without removing the finger from the controller.

The life of finger springs is increased by the proper adjustment of the fingers. Too much "drop" causes the

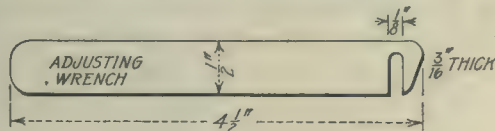
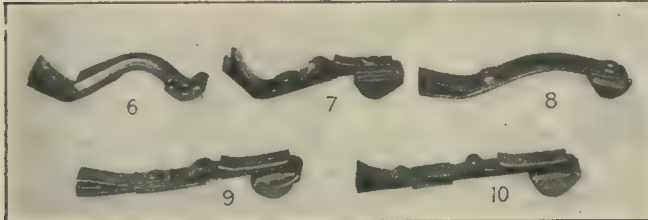


FIG. 5—FINGER ADJUSTING WRENCH

finger to stub, producing severe strains on the spring; while on the other hand, too little drop will reduce the pressure of the finger on the segment to such a degree that the contact surfaces will burn. "Drop" is the distance the finger falls below the surface of the segment when they are separated by turning the controller to the "off" position. It should be measured from the surface of the segment to the part of the finger that



engages the segment. If the segments are worn at the ends, measurement should be made from the normal surface of the segment and not from the end, as the total movement of the finger at its point of contact with the segment should not exceed  $\frac{1}{8}$  in. When adjusting new fingers in a controller having badly worn segments particular attention should be given to this point. If the proper adjustment cannot be obtained the segment is worn out and should be replaced. An exces-



FIGS. 6, 7, 8, 9 AND 10—TYPES OF FINGERS FOR DRUM CONTROLLERS

sive drop makes the controller operation more difficult, increases the wear on the fingers and segments, and materially shortens the life of the finger spring. It frequently causes the finger to stub and buckle, and if continued will finally break the spring. Fig. 4 illustrates the method of measuring drop and gives limits of variation that have been found satisfactory, both as to contact and life of the finger spring.

#### FINGERS SHOULD MAKE CONTACT ACROSS ENTIRE WIDTH

Another adjustment of controller fingers, of vital importance in securing good contact, is to twist the finger so that it touches the segment across its entire width. Frequently, when a new finger is put into a controller, no attention is given to this adjustment and the finger touches the segment at only one point.

If the fingers do not have a line of contact across the segments, overheating of the segments and fingers may take place, causing the finger spring to soften and lose tension. Twisting the fingers, particularly the reverse fingers, can best be accomplished in the K-35 and K-36 controllers by using the adjusting wrench shown in Fig. 5. This wrench fits over the finger spring and shunt and it is of sufficient width to permit adjusting one-half the fingers at a time. It should be put on the spring just back of the finger tips.

One way of preventing springs from breaking in service is to discard the spring when the tip is worn out. As a general rule the finger spring cannot be depended on to out-wear more than one tip, though in some cases a single spring will out-wear several tips. This will occur oftener with the more recent designs of fingers, where the spring is relatively longer than the contact piece, than with the older types where the spring is shorter. In designing these later types of fingers particular attention has been given to distributing the bending throughout the length of the spring, as a spring will break much more quickly with the bending localized than when distributed.

Fig. 6 shows the familiar old-type finger, while Figs. 7 and 8 show fingers of recent design having long springs and short tips that may be used in place of the old-type finger. The finger illustrated in Fig. 8 is for

the K-6 controller, while Fig. 7 shows the one for the K-10, K-11, K-12 and K-28 controllers.

Fig. 10 shows the type of finger used in K-34, K-35, K-36, K-39, K-40 and K-51 controllers. Fig. 9 is a similar finger but of more recent design which embodies several improvements over the earlier finger. Among these are the use of a single grommet instead of three rivets around the adjusting screwhole, thereby leaving more metal in the finger; and the bending of the finger spring is better distributed by the long brass plate under the finger spring than with the short plate used with the old finger. The brass plate on top of the shunts, through which the adjusting screw passes, assists the lower plate in distributing the bending and also prevents turning of the locking device for the adjusting screw.

### First Concrete Gondola Car

A GONDOLA CAR with concrete walls and floors on March 17 was turned over to the Illinois Central Railroad for operation. This car was invented and designed by Joseph B. Strauss, president of the Strauss Bascul Bridge Company, and was built by the R. F. Conway Company of Chicago. The construction of this car was started as a war measure when it was thought that, due to the shortage of steel, it might be possible to relieve the car shortage materially by developing concrete construction.

The fundamental feature of the design consists of a steel skeleton body forming the outer boundary of the car and mounted upon a steel underframe. The concrete walls and floors are contained within this frame, and, together with the frame and floor reinforcement, are connected to and interlocked with the underframe. The steel frame forms the finishing and protecting edges, thus entirely shielding the concrete and also serving as a complete system of stress-bearing members. The car was designed for a capacity of 100,000 lb. plus the usual 10 per cent overload. The



FIRST REINFORCED CONCRETE CAR

car has an over-all length of 41 ft. 6½ in., and an over-all width of 10 ft. 2½ in., with sides 4 ft. 10½ in. high. The steel members of the underframe consist only of the center sill, which is of two 12-in., 35-lb. ship channels, with a ½-in. x 20½-in. cover plate, and the body bolsters and diagonal corner braces, which conform to standard design. There are six reinforced concrete cross-bearers in the car, spaced approximately 4 ft. 6½ in. apart. The floor is 2½ in. thick, reinforced with longitudinal and transverse rods ½ in. in diameter and the walls are 1½ in. thick. Arch bar type trucks fitted with M. C. B. No. 2 brake beams are used. The car weighs 53,600 lb.



## Composition and Characteristics of Lining Alloys\*

**Cost of Lining Alloys Depends Upon Proportion of Various Metals Used — Should Not Be Judged by Prices Quoted**

THERE is only one babbitt metal, and that is made to the formula originated by Isaac Babbitt about sixty years ago. It is composed of 88.9 per cent tin, 3.7 per cent copper and 7.4 per cent antimony. All other lining alloys are the result of attempts to improve the physical characteristics of the composition produced according to this formula or to reduce its price. By custom these various combinations have been called babbitt metals, even though they contained no tin or copper, but consist of lead and antimony.

A lining alloy is a soft metal interposed between two hard surfaces. One of these, which holds the metal, is usually stationary and the other revolves. The purpose of the lining is to eliminate friction as far as possible, and should lubrication be neglected it would present such a surface to the revolving shaft that should frictional heat develop the metal will wear out without damaging the shaft. In other words, the true function of a lining alloy is to wear out and if the lining alloy does not wear the shaft will.

Tin is a crystalline metal about No. 9 in the Brinell scale of hardness. It is very malleable and takes a high polish. When antimony is added the tin becomes harder and its compressive strength increases. This also increases its brittleness so that copper must be added to give toughness or tensile strength. The addition of antimony and copper, as found in genuine babbitt metal, brings the composition up to a Brinell hardness of about 28, or more than three times that of pure tin.

### VARIOUS ELEMENTS HAVE DIFFERENT MELTING POINTS

The mixing of copper, antimony and tin is not an easy matter, because tin melts at 453 deg. Fahr., antimony at 786 deg., and copper at 1982 deg. In order to get the copper and antimony properly introduced to this mass of tin an understanding of how to handle these metals at their widely varying temperatures is required. Genuine babbitt, properly made, shows a matrix of tin, and all through this are crystals composed of tin and antimony, copper and antimony, and tin and copper. These crystals constitute the bearing points in genuine babbitt. All other lining alloys are of the same structure to a more or less extent. Tin and antimony are anti-frictional, but lead, an oily and greasy metal, is the best for anti-frictional purposes. Unfortunately, however, pure lead is very soft and by itself has no value as a bearing metal. It also alloys with other metals with great difficulty.

Manufacturers of alloys have recognized the value of lead as an anti-friction metal and have tried to use as much of it as possible. This has resulted in a series of alloys ranging from 92 per cent of tin and no lead, down to 95 per cent of lead and no tin. There are hundreds of branded alloys varying from each other a few points in tin, lead, antimony and copper, which have been brought into being in an attempt to conserve price. A purchasing agent can always buy a lining metal at his own price. This will be readily

understood when it is taken into consideration that with tin selling at 75 cents a pound and lead at 5 cents a pound, it is only necessary to take out 2 per cent of tin and add 2 per cent of lead to make a difference of 1½ cents per pound in the price. The proper way to buy lining metals is for each purchasing agent to specify his requirements by giving sufficient data as to the maximum revolutions per minute, the pressure per square inch which will have to be withstood, together with the method and character of lubrication and the condition of the service. This information should be furnished the lining alloy manufacturers so that they can recommend the proper alloy to be used.

### CHARACTERISTICS NECESSARY IN LINING ALLOYS

There are four fundamental requisites in a lining alloy: compressive strength, tensile strength, heat resistance and anti-frictional qualities. These are enumerated in the order which seems to be the order of their importance. A lining alloy to be of value must have, first, sufficient compressive strength so that it will be able to hold up the maximum load per square inch that is liable to be put on the bearings without squashing out. Second, it must have sufficient tensile strength so that if the bearings are subjected to vibration or pounding it will not break apart. Third, it must have sufficient heat resistance so that should the bearings become hot the alloy will stand the highest possible temperature before it begins to flow. Without these three qualities any anti-friction metal has no great value. Under ideal conditions there is supposed to be a film of oil between the lining metal and the shaft at all times. It is only when the oil film is not maintained that the anti-frictional qualities of the metal become of real importance.

Another matter of interest is the relation of the above four points to the characteristic of the four metals used in the manufacture of bearing alloys, namely, tin, lead, antimony and copper. If compressive strength was all that was needed, an alloy could be made of 80 per cent lead and 20 per cent antimony, which would be of 32 Brinell hardness, or harder than genuine babbitt. As far as holding up the load is concerned, this metal would answer every purpose. While antimony will harden lead, when a certain percentage is passed the antimony and lead become very brittle, so that with 80 per cent lead and 20 per cent antimony the alloy is almost like glass and the slightest vibration will break it to pieces. Therefore, to combine the qualities of compressive strength with tensile strength tin must be added to the lead and antimony. Tin has an affinity for lead and together they give a quality of hardness, that is, compressive or tensile strength and elasticity. It is not sufficient to get this elasticity alone, but the metal must be tough in its elasticity. Copper must then be added, which, having an affinity for tin, will toughen the tin. The amount of each element that is put into the alloy has a definite relation to the necessary characteristics.

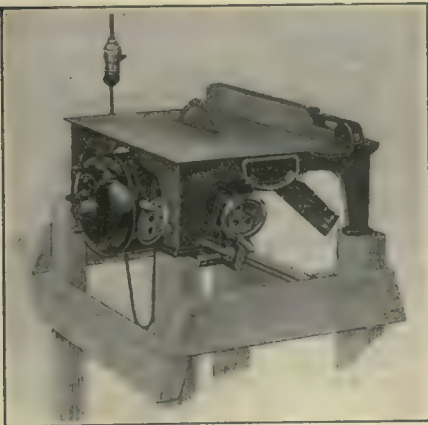
The question has often been asked as to whether lining alloys can as satisfactorily be made from scrap metals as from new metals. A good lining alloy can be made from scrap metals and may do the work satisfactorily because of the unusual factor of safety that is used. But although alloys made of scrap metals are sold at a lower price they are really not cheaper than alloys made of new metals. Every time that metals are melted a certain amount of oxidation takes

\*Abstract of an address made by Alfred A. Greene of the National Lead Company, before the Purchasing Agents' Association of St. Louis at the meeting held on Feb. 18, 1919.



place. If scrap metals are used the oxides are present, and in the ordinary shop practice they cannot all be eliminated. These oxides come to the top when the metals are melted and are skimmed off in the form of dross. Thus there are not as many pounds of metal in the bearings from the same formula as when new metal is used. Again, the physical structure of the alloy is weakened when scrap metals are used, as for example when old lead pipe is employed. This is usually obtained from buildings where it has become corroded or rotted due to the fluid that has passed through it. It may contain lime, potash, sulphuric acid, or a number of other things. The impurities cannot be removed simply by melting the lead. A chemical reaction has taken place in the lead and it has lost its original characteristics. Where scrap tin is used there is liable to be a small percentage of iron left in the metal from the detinning process, which will destroy the lining alloy. In genuine babbitt the presence of less than one-fourth of 1 per cent of arsenic or sulphur effects the metal so that it will not stick to iron or brass boxes, and the mass will be filled with little holes which tend to weaken the physical structure of the metal. New copper is soft and tough and it is the toughness that is wanted in the bearing metal. Where scrap trolley wire is used it is often found that it has become brittle in use due to having lost some of its tensile strength. This condition cannot be changed by simply putting the copper into a pot and melting it over again.

### New Bench Saw for Woodworking Shop



NEW TYPE PORTABLE BENCH SAW

ing up the table. This makes it possible to cut long stock without fear of breaking the angle by the stock coming in contact with the floor. The table is always in a horizontal and safe position, and the exact angle of the cut can be set by turning a hand wheel until the angle desired is registered on a dial in the front of the machine. This tilting mechanism swings the cradle in which the motor-driving mechanism and saw are mounted.

The saw can be raised and lowered so as to cut or groove the stock to any depth up to 2 in. The raising and lowering mechanism is similar to the tilting mechanism and is controlled by the hand wheel in the front of the machine. The bench saw is provided with a Wallace shutter saw guard. This is built into the machine and slips back as the stock goes through, so that it never interferes with the efficient operation of the saw.

**A** BENCH tool, portable, and designed to operate on the electric lighting circuit, has been placed on the market by J. D. Wallace & Company, of Chicago. Several new features are incorporated in the design. To cut at an angle, the saw is tilted instead of cock-

### New Type of Conveyor Reduces Cost of Handling Material

**A** NEW TYPE of portable scoop conveyor shown in the accompanying illustration has been placed on the market by the Portable Machinery Company, Inc., of Passaic, N. J. The most distinctive feature of this, as compared with other similar types of machines, is the scoop on the digging end, which can be pushed or completely buried in the materials to be conveyed. This makes it possible simply to scrape the material into the carrying belt instead of lifting it up by shovelfuls and putting it into hoppers, as is ordinarily the practice with conveyors. The sides or skirt plates



LOADING A WAGON WITH COAL BY MEANS OF A SCOOP CONVEYOR

of this conveyor form a trough, which increases the carrying capacity of the belt to a considerable extent. These sides hold the material together, thus making the whole width of the belt available for carrying.

The carrying capacity of the scoop conveyor based on handling coal is 1 ton per minute, provided a sufficient amount of coal is maintained at the receiving end of the machine. With a storage pile of sufficient height, one man can easily feed 1 ton in one and one-half minutes, or if the pile is low he may require from two to four minutes. This scoop conveyor may be used for storing, reclaiming and loading bulk material and light articles such as coal, ashes, sand, earth, crushed stone, salt bags or light packages. It may be used singly or in tandem as required.

The steel frame holding the rollers of the conveying belt is mounted on wheels. The whole is perfectly balanced so that one man, by inserting the pipe handles into the ends of the horizontal members, can easily lift or move the machine around. An electric motor or gasoline engine mounted under the frame transmits power to the conveyor by means of a chain and sprocket connection to a shaft extending beneath the conveyor. From a sprocket on the other end of this shaft the power in turn is transmitted to the driving sprocket located at the upper end of the conveyor. The carrying belt is of fine grade duck and rubber, with duck cross-strips. These transverse cleats are provided to prevent the material from slipping back down the incline. The conveyor is made in three different sizes—with lengths of 13 ft. 8 in., 19 ft. 8 in. and 24 ft. The width of the conveying belt on any of these sizes may be either 12 in. or 16 in., as desired. Size 13 ft. 8 in. elevates its load to a total height from the ground of 5 ft. 9 in.

In the accompanying illustration the conveyor is shown handling coal on the property of the Haverhill (Mass.) Electric Company.



## LETTERS TO THE EDITORS

### Is Pipe Drainage a Cure for Electrolysis?

165 BROADWAY

NEW YORK, N. Y., March 16, 1919.

To the Editors:

My attention has recently been called to an article by D. W. Roper in the issue of the *ELECTRIC RAILWAY JOURNAL* for Dec. 7, 1918, entitled "Drainage if Necessary vs. Negative Feeder Electrolysis Protection." In this article Mr. Roper essays the role of a champion of pipe drainage as a solution of the electrolysis problem. Lest Mr. Roper's enthusiasm for pipe drainage may perhaps lead some who have not closely followed this subject to think that a cure for all electrolysis troubles has now been found, it seems well to point out that no such interpretation should be placed on what Mr. Roper says. On the contrary, it should be understood that: (1) It is an open question whether pipe drainage ought to be used at all; (2) assuming that there is a field for pipe drainage, no one knows to what extent its use is justified, and (3) neither of the foregoing questions can be answered rationally and conclusively until a great deal of additional data have been secured, properly analyzed and thoroughly studied and digested. No one questions the effectiveness of drainage for cable sheaths, but lead cable systems and piping systems are fundamentally different, and Mr. Roper's argument that because drainage will protect lead cable sheaths it should also protect gas and water piping systems is merely begging the question.

As to the comparison between a drainage installation and an insulated return feeder installation in Chicago the results obtained from these two throw little or no light on their relative merits as electrolysis protective systems, nor do they permit of generalizing as to costs because the conditions are so different in the two cases. In the Illinois Street substation district, where pipe drainage was installed, the area under test is relatively small, the rail network is congested and the feeding distances are short. In the Crawford Avenue substation district, where the insulated return feeder system was installed, the area involved is extensive, paralleling and inter-connecting tracks are relatively few, and feeding distances are long. It is obvious that the cost of reducing stray currents in pipes to a given value is much greater under the conditions prevailing in the Crawford Avenue district than under the conditions in the Illinois Street district. So much for the relative costs. As to the relative performance of these two installations in reducing electrolysis damage, little or nothing has been made known. The figures given by Mr. Roper showing current flow on pipes in the Illinois Street district, with and without drainage, have no direct bearing on this question.

If the matter of efficacy in preventing electrolysis damage is ignored, there is no rational basis for making comparisons between costs of pipe drainage and costs of insulated return feeders.

Extensive investigation is required to determine how much electrolysis protection is afforded by either the pipe drainage system or the insulated track feeder system. However, it is known that the insulated feeder system, by reducing stray currents, gives *some* elec-

trolysis protection. Whether pipe drainage affords *any* protection against electrolysis as a net result is not definitely known.

The writer cannot agree at all with Mr. Roper's argument of conclusion respecting so-called "joint electrolysis." This phenomenon has frequently been pictured as localized right at the pipe joints, the current being supposed to leave the pipe and enter it again within a few inches of the joint. On this supposition, corrosion would be expected in the immediate proximity of the joints on the positive side. Now the writer has seen instances of corroded joints, but anyone who will consider the stray current paths and their electrical characteristics will readily see that the effects due to joints are usually of quite a different character. A joint which has a resistance markedly different from normal tends to cause a shunting of current through by-paths or to other structures, at points which may be near to or may be remote from the joint in question. Bearing this in mind it is not surprising that certain efforts, to which Mr. Roper refers, to find corroded joints proved unavailing.

Mr. Roper makes reference to the insulated return feeder system installed in the Ann Avenue substation district in St. Louis, and gives curves showing potential differences between rails and pipes in this district and in the two Chicago installations. In this Mr. Roper makes the serious error of comparing such potential differences in a district where the pipes are drained with the potential differences in districts where pipe drainage is not employed. Whatever significance as to the electrolytic condition of the pipes such potential differences may have in an undrained district—and at best they do not afford a dependable criterion—they have no comparable significance in a district where pipe drainage is employed. Such comparisons are, therefore, fallacious. This error may possibly be related to Mr. Roper's misinterpretation of the passage which he quotes from a report on the Ann Avenue installation in St. Louis, of which the present writer was a joint author, as follows:

Values which experience has shown afford a substantial measure of protection from injury by electrolysis to underground structures.

Mr. Roper takes these "values" to refer to potential differences between rails and pipes. This is not correct as is apparent on reading the entire sentence in the report from which he quotes, which reads as follows:

The tests above detailed show that it is feasible by means of a small number of insulated return feeders to bring about an approximately constant potential condition over a large area, and to reduce the drop in the tracks and, therefore, in the earth, to values which experience has shown afford a substantial measure of protection from injury by electrolysis to underground structures.

The statement, therefore, did not refer to potential differences between rails and pipes but to potential drop in the tracks, which is quite a different matter, and consequently the conclusion drawn by Mr. Roper from this reference is unsound.

The writer does not despair of the ultimate establishment of some procedure which will effectually prevent damage from electrolysis, but he wishes to enter a plea for caution in drawing conclusions on a subject which is so little understood and so fraught with speculation, prejudice and misinformation. Though ultimately it may possibly be found that pipe drainage



has a field of justifiable use, sufficient evidence is not yet available either to justify it or condemn it, but in the writer's opinion such evidence as we now have tends much more strongly to its condemnation than to its justification as a primary means of electrolysis protection. However, considerable scientific work has been done and much more is under way or under consideration, and it is the writer's plea that final judgment be withheld as to the efficacy of any system of mitigation until sufficient facts are available to permit conclusions of real value to be drawn. ELAM MILLER.

[EDITOR'S NOTE—Mr. Miller's letter was submitted for comment to Mr. Roper who replied as below.]

COMMONWEALTH EDISON COMPANY  
CHICAGO, ILL., March 30, 1919.

To the Editors:

I have read with considerable interest Elam Miller's comments on your abstract of my paper presented before the St. Louis section of the A. I. E. E. The paper was an attempt to present the technical data and the results of tests of a carefully designed drainage system installed in Chicago, together with similar information regarding an insulated negative feeder system installed in another district in Chicago, and also to compare these results with such published information as was available regarding similar systems installed in St. Louis. The insinuation that I think that "a cure for all electrolysis trouble has *now* been found" is hardly warranted by any statement in the text; and as far as the word "now" is concerned, the abstract includes a reference to the published description of a drainage system by Mr. Farnham nearly twenty-five years ago.

Mr. Miller endeavors to prove that he has been misquoted and alleges that the writer in error misrepresented the intent of his statement so that potential drop in the tracks was made to appear as potential differences between rails and pipes. Another quotation from the same report, of which Mr. Miller was a joint author, may serve to illuminate this point:

In the article contributed by the Bureau of Standards to the ELECTRIC RAILWAY JOURNAL of Jan. 17, 1914, to which reference has already been made, the cost of this insulated return feeder installation is shown to be comparatively small.

The same article gives results of tests which show that the currents and potentials on underground piping systems in this district have been rendered so small that the structures are considered comparatively safe from injury by electrolysis.

It will also be noted that Mr. Miller uses the measurements of current and potential to prove the effectiveness of the installation in the Ann Avenue district, but he seriously objects to having exactly similar figures exhibited as an argument in favor of the drainage system as applied in the Illinois Street substation district.

Mr. Miller's statements and arguments appear to say that if the currents in the pipes in a district where the insulated negative feeder system is employed are no greater than the currents in the pipes where the drainage system is employed, then the two systems are equally effective; but in making it so appear, he overlooks the fact that with the insulated negative feeder system, currents traveling along the pipe must leave the pipe somewhere and have no place to leave except through moist earth where damage by electrolysis will be caused; but in the case of the pipes where the drainage system is used, the currents traveling along the

pipes leave the pipes over a metallic connection through the drainage cable so that their departure occurs without damage to the pipes.

Mr. Miller presents a carefully devised description of "joint electrolysis" which is quite different from the phenomenon that has heretofore been known by that name, but it is somewhat difficult to understand how electrolysis could occur in the manner which he describes with certain differences of potential between pipes or between pipes and rails, which are plainly set forth, when the same potential differences in the Ann Avenue installation in St. Louis are declared to be "comparatively safe."

The generalizing as to costs specifically referred to the systems under discussion and was largely an arithmetical deduction from the data presented. It would hardly have been given, however, had not the figures been verified by similar calculations in other districts.

The writer shares with Mr. Miller the desire to see the ultimate establishment of some procedure which will effectively prevent damage from electrolysis, but if the advocates of any one system of electrolysis mitigation or prevention will thrust aside as having no direct bearing on the situation all information which tends to favor some other system, then the final conclusions regarding the merits of the several systems may be deferred until judgment day.

It is the writer's opinion that in the determination of the best system of electrolysis prevention, no better way can be found than to publish all information that will add to our knowledge regarding the merits of the several systems, and wherever possible, to make a careful comparison of the several systems on the same basis. It is hoped that you will continue to publish such information when it is available, and in doing so to express your own comments on the data presented as freely as you did in the present instance, by substituting for the author's title, "Electrolysis, A Comparison of Conditions in St. Louis and Chicago," your own title, "Drainage If Necessary versus Negative Feeder Electrolysis Prevention," and by inserting a number of paragraph headings which were not in the original paper, as for example, "Drainage Cables Better Than Negative Feeders." It is suggested, however, that the editorial comments might preferably be separated in some manner from the contributed matter. Apparently these editorial comments were considered by Mr. Miller as portions of the original paper and evoked a large part of his criticism.

D. W. ROPER,  
Superintendent of Street Department.

## Is Electrolytic Joint Corrosion Serious?

AMERICAN GAS ASSOCIATION  
PHILADELPHIA, PA., March 20, 1919.

To the Editors:

An article has recently appeared in the ELECTRIC RAILWAY JOURNAL entitled "Drainage or Negative-Feeder Electrolysis Protection." D. W. Roper, the author of this article, proposes electrical drainage of gas and water pipes as a cure for all electrolysis troubles. It is true that this would be an easy solution of this difficult problem if the gas and water pipes were continuous conductors, such as are the lead cable sheaths. Mr. Roper's conclusions are all based on the supposition that gas and water-piping systems do not have high-resistance joints, and that current flowing



along a pipe encountering a high-resistance joint does not cause corrosion of the joint where the current flows around the joint through the surrounding soil.

Joint corrosion is by no means the most serious objection to electrical drainage of piping systems. High-resistance joints such as are always present in gas and water-piping systems with lead or cement joints will cause the stray currents carried by these piping systems to leave the pipes, to flow to other sub-surface metallic structures, causing electrolytic corrosion of the pipes at locations other than directly at the joints. This trouble is generally more serious than electrolytic corrosion directly at the joint.

However, let us discuss the question of joint corrosion. Mr. Roper states that "an earnest endeavor was made to find an actual case of joint electrolysis in Chicago. No such case has ever been found." This statement is quite sweeping in character and misleading to those not familiar with conditions in Chicago and throughout the country. The Palmer report, covering the electrolysis investigation in Chicago, shows a photograph of a serious case of joint corrosion where the fittings in the pipe were on the spigot end of the pipe. Such authorities as the late Prof. A. F. Ganz, D. H. Maury, chairman of the electrolysis committee of the American Waterworks Association, Professor Blake who reported on electrolytic conditions in Kansas City and Richmond, and A. A. Knudson who reported on the electrolysis situation in New Bedford, all agree that joint corrosion may be serious.

Mr. Von Maur, chairman of the electrolysis committee of the American Gas Association, reports a number of cases of serious joint corrosion in St. Louis where holes were eaten entirely through the gas mains, all of the trouble being confined to the 18 in. near the joint. The writer has seen a number of serious cases of joint corrosion in locations where the gas and water mains are negative to all adjacent structures, where electrical measurements were taken to establish this beyond doubt. I question whether electrical drainage of piping systems should be permitted at all.

It should be further pointed out that the electrical drainage system which was installed in the Illinois sub-station district in Chicago was in operation less than ten days. No conclusion can therefore be drawn from this installation.

H. C. SUTTON.

## Coasting Saves Power in Twin Cities

Even Fractional Installation Indicates that Substantial Savings Are Being Made

AS OF JUNE 15, 1918, the Twin City Rapid Transit Company had already installed 340 out of the 1100 Rico coasting recorders purchased to outfit its system completely. Part of these 340 were on four fully-equipped lines out of Nicollet station as follows: Marquette and Grand; Fourth Avenue south and Sixth Avenue north; Monroe and Bryant; Fifty-fourth Street and Columbia Heights. Other lines are in process of being equipped and while the installation is still not complete the company is well pleased with the results obtained.

Records were taken from the time the first recorders were put out, but the first comparative statement for the information of the men at Nicolett station was not issued until April 1. This was accompanied by a bulletin from General Superintendent Caufield, who ex-

plained why men on the extra list would be grouped by themselves for the sake of fairness. Mr. Caufield also pointed out that a man's coasting record was in direct proportion to the amount of his willingness and earnestness to "Save and Serve."

At the very beginning of the year 1918 the company issued to the trainmen a booklet entitled "Doing Our Bit—Coasting and Its Relation to the War." At the opening was this quotation from Bulletin 183 of the United States Fuel Administration: "An investigation convinces us that electric railways offer a chance for large savings." The relationship between coasting and fuel saving was succinctly portrayed thus:

MORE COASTING → LESS POWER  
LESS POWER → LESS COAL

An informal coasting campaign had indicated to the company that with the co-operation of the trainmen the total amount of coasting then being done could be increased by not less than 10 to 15 per cent. This estimate, as will appear later, already was very greatly exceeded—a compliment to the management, the men and the coasting recorder.

The remainder of the pamphlet gave the men good suggestions on how to operate more efficiently through increased coasting and how to key the coasting recorder and turn in the printed record therefrom. The conclusion said: "The more you coast, the more coal you will save, the easier will be your work, the less will be the wear and tear on the car equipment, and the safer and more comfortable will be the ride of passengers, the customers who pay your wages."

"In the interest of safety and economy, and on behalf of the nation at large, the management asks the hearty co-operation of each trainman toward the successful carrying out of this campaign."

That the men responded heartily from the start to this appeal to save power is clear from the following results secured during the first half of last year:

COASTING PERCENTAGES ON TWIN CITY LINES OUT OF NICOLLET STATION

	January	May	June
Marquette and Grand.....	25.6	31.2	30.2
Fourth Avenue South and Sixth Avenue North....	21.5	25.7	24.9
Monroe and Bryant.....	22.0	28.7	28.1
Fifty-fourth and Columbia Heights.....	22.2	27.8	26.8
Extra list.....	23.9	25.5	25.4

It is hardly necessary to point out that from the very beginning the men showed a big advance over the ordinary unchecked motorman. The slight drop in June did not indicate a decrease in efficiency, because some of the lines were speeded up at the same time that increased travel increased the number of stops per mile. Nor is any attempt being made to drive the men. The management is satisfied that if the men are thoroughly imbued with the importance of coasting they will continue to improve steadily and permanently. It is much more to the point to have a good general average than a few very high ones and a mass of low ones.

On the basis of only 30 per cent equipment of the Twin City lines with coasting recorders, Chief Engineer Scofield found an energy saving of 5 per cent for the whole system, which would indicate a saving of at least 16 to 17 per cent for complete installation. Mr. Scofield has kept careful records of energy consumption per car-mile over many years. With due allowance for weather and temperature conditions, the saving can be accounted for only through the correct use of the coasting recorders.



## AMERICAN ASSOCIATION NEWS

### Current Association Questionnaires

**T**HE committee on power generation has just sent out data sheet No. 187 to secure statistics on the cost of producing electrical energy. The questions are such as to permit the character of the load to be considered, and the operating expenses are to be segregated under these accounts: Superintendence of power, buildings, fixtures and grounds, power plant equipment, power plant employees, fuel for power, water for power, lubricant for power, miscellaneous power plant supplies and expenses.

The committee on one-man car operation is asking for very comprehensive information on this subject. Among the important items are the following: Number of one-man cars of Birney and other safety types operated; number converted from former types; safety devices installed; average car weight on system and of one-man cars; length of time one-man cars have been operated; average energy distributed per car-mile on system and on lines equipped with Birney cars; hourly wages paid to operators of one-man cars and other cars; popularity of one-man cars; type of employee most suitable for one-man car operation; relations with trainmen in connection with one-man car service; attitude of the public toward one-man cars; relation of one-man cars to increases in services, schedule speed, headway, track capacity, etc.; effects on earnings; effects on jitney competition; effects on accident hazards; effects on car and track maintenance.

### Way Committee Starts Work

**T**HE Engineering Association committee on way matters met at association headquarters on March 28. A digest was presented showing the work which had been done by the committee just previous to the suspension of activities. The executive committee assignments were then considered and divided among the members. Those who attended the meeting were C. H. Clark, Cleveland, Ohio, chairman; W. R. Dunham, Jr., New Haven, Conn.; H. Fort Flowers, New York; C. G. Keen, Philadelphia, Pa.; E. M. T. Ryder, New York, and N. B. Trist, Pittsburgh, Pa.

### Optimism Prevailed at Waterbury Meeting

**A**S A RESULT of an unusually energetic publicity campaign on the part of the local committee the Waterbury meeting of the Connecticut Company section, held on March 27, was attended by a large number of members and guests, namely 312. As usual an informal dinner preceded the meeting. Special cars were run from Hartford, New Haven and Bridgeport to the meeting. C. H. Chapman, local manager, presided and aroused enthusiasm by the statement that the safety cars for Waterbury will begin to arrive on April 7 and will be received at the rate of three per week until fourteen are delivered.

Corporation Counsel Hugh G. Church represented the Mayor in welcoming the visitors and he was followed by John H. Goss, general superintendent Scovill Manufacturing Company, who spoke on industrial re-

lations. Mr. Goss criticised the basis on which the War Labor Board was founded, the work of the board being of a curative rather than a preventive nature. Mr. Goss attributed the freedom of Waterbury from labor disturbances to the fact that the industries are home owned and that mutual understanding exists between the managements and the employees. J. F. Berry, attorney for the Connecticut Company, touched upon legislation affecting the local trolley lines and explained the investigations regarding which a report was to be made on April 1. It was understood that the investigating committee is ready to grant relief necessary to keep the roads going for the next two years, but payment of dividends is not yet in sight.

Another legal speaker was Benjamin I. Spock, formerly attorney for the railway company. He told of the co-operation which had been necessary between the Chase interests, which he represents, and the railway company, which had worked together to keep up the service between Waterbury and Waterville in order to keep the mills going on necessary war work. John J. Cassidy, attorney and general manager Waterbury-Milledale Tramway, paid a powerful tribute to the loyalty of the Connecticut Company employees. In conclusion Chairman Chapman spoke briefly regarding the trials and tribulations of the electric railway business but said that he considered the future to be promising.

The evening was enlivened with music, and a clever sketch showing the operation of the one-man car was staged by the local committee.

### War Reminiscences at Chicago Meeting

**A**T THE MARCH 25 meeting of the Elevated Railway company section several speakers told of their personal experiences at the front. Sergeant E. A. Schaaf of the First Gas Engineers described his work, Captain H. E. Fisher took up the Army medical work and Ensign W. G. Woods spoke of his training and work in the Navy. J. A. Jarvis emphasized the importance of loyalty on the part of employees toward the company and the value of co-operation between departments. J. M. Feldhake urged that each employee in traveling over the system constitute himself a committee to observe and report any feature in connection with train operation that might call for improvement. R. N. Griffin also gave a humorous outline of his work as superintendent of the "Loop."

### Activities of the London Safety-First Council

**A**VERY active organization for accident reduction is the London (England) Safety-First Council which was organized about two and a half years ago. It comprises representatives of thirty-eight local authorities, six of which are also tramway authorities, seven railways, three tramways, five omnibus companies, two vehicle workers' associations, sixteen technical research societies, professional associations, etc., thirteen commercial firms and a few others. The detail work is assigned to the drivers' educational committee, the street safety committee, the railway safety committee, the schools propaganda committee, the industrial safety-first committee, the publicity committee and the general purposes committee. That the work of the council is effective is indicated by the fact that during two years the decrease in fatal accidents was about 24 per cent and in the total of accidents 36 per cent.



## Recent Happenings in Great Britain

### Labor Unrest Continues—Need for Higher Fares More and More Apparent—Plans Developing for Reconstruction and New Work

(From Our Regular Correspondent)

Great Britain, no less than the United States, has been troubled with labor unrest and strike upheavals. The Bolshevik element among the ship-building and engineering workmen on the Clyde brought about strikes and riots in Glasgow in the beginning of February. Belfast industries were brought to a standstill through strikes. Local railway transportation in London was paralyzed. The trade unions concerned backed the London strikers, but elsewhere stoppages were "unauthorized." Outside of London there is a special tendency for the workmen to break away from their trade union leaders and to go on strike in defiance of agreements. The spirit of unrest and impatient desire for improved conditions everywhere leads to demands which are often impracticable. Among the pretences for asking for shorter working hours without reduction of pay is that unemployment will thus be prevented. Unemployment does exist to some extent, but it can only be temporary, and there is an elaborate state organization for getting into employment the men discharged from the army.

#### GLASGOW STRIKE A FAILURE

So far as the tramway services were concerned, the strike in Glasgow was a failure. The men refused to come out, and though a number of cars were damaged on the streets by the rioters the service was not interrupted. In Belfast the tramway service was suspended because the employees in the municipal power station stopped work. The service was restored on military protection being given. The strike on the underground railways of London was dealt with in a special article in the *ELECTRIC RAILWAY JOURNAL* for March 8, page 478.

At the end of February the British public was in a state of suspense over the result of negotiations between the government and the allied federations of coal miners, railwaymen and transport workers. The demands were extortionate and yet, if refused or no compromise reached, national paralysis was threatened.

#### FAVORABLE YEAR FOR UNDERGROUND

The reports presented to the annual meetings of the London underground electric railway companies in February show that in spite of adverse war conditions last year was the most favorable in their history. Labor and materials were scarce and dear, but in spite of that the companies carried more passengers than they did in any previous year. Dividends to shareholders have improved, but they are still low, as the capitalization of such lines is necessarily very heavy. That being so, and considering also the present congestion of traffic, it is un-

likely that any great improvement in the percentage return on the par value of the stock can be looked for unless there is considerable increase of fares. The 50 per cent increase imposed by government order on the railways of the country generally does not apply to the London "tube" railways, which up till now have increased their fares only slightly. Further increases were foreshadowed at the annual meetings in February and also additional capital expenditure for developments and improvements now much in arrears owing to the war.

#### LONDON SUBURBAN TRAFFIC DEVELOPING

The chairman of the London & South Western Railway, Brigadier-General Drummond, gave some interesting particulars at the annual meeting of the company on Feb. 21 on the development of traffic on the London suburban lines of the company since they were changed from steam to electric traction. He said that the improvement had exceeded all expectations. In the year 1913 the number of local passengers carried in the suburban district was 25,000,000; in 1915, before electrification, the number had increased to 29,000,000; in 1917 the number was 33,000,000 and last year the total number of local passengers carried was 40,000,000, or an increase of not less than 17,000,000 compared with the year 1915, or about 75 per cent.

Two of the biggest municipal extension schemes at present specified are those of Liverpool and Coventry. The former city wishes to borrow an additional sum of £550,000, to be expended as follows: Generating plant, £200,000; electric mains, £190,000; new cars, £70,000; motor garage and equipment, £15,000; new car shed, £10,000. Coventry proposals are estimated to cost £333,000 for reconstruction and doubling of certain tracks, reconstruction and extension of other lines, new cars, new car shed, etc. The Corporation of Manchester intends to build 100 new car bodies itself and ask tenders for others. In regard to motor omnibuses, the Associated Equipment Company, sole builder for the London General Omnibus Company, seems in a fair way to getting much of the business.

Prices are, of course, very high, but arrears accumulated during the war are so heavy that tramway authorities must have the stuff, now that it is beginning to be obtainable. In regard to rails, during the war when none could be obtained in this country Middlesex County Council ordered a small quantity from the United States which included freight and insurance cost £30 a ton, compared with £7 10s. before the war. The maximum price in this country is now £17 10s. a ton. Major Fred Coutts, manager of the Paisley

Tramways, and secretary of the Scottish Tramway Officials' Association, has issued an appeal to tramway authorities to support a movement in favor of their getting authority speedily to increase fares in order to meet higher working expenses and the great cost of materials. In connection with the latter he has put forward a very interesting tabular comparison of prices which is included in the review of electric railway trade conditions in Great Britain in the *Manufactures and Markets Department* elsewhere in this issue of the *ELECTRIC RAILWAY JOURNAL*.

#### PLEA FOR FARE INCREASE

Major Coutts makes a very strong case for authority to raise fares immediately above the present statutory maxima instead of having to wait as at present until after a loss on working has been shown. As an additional reason for such power, he points to the present extortionate demands of tramway employees for a forty-four-hour week and other concessions. Such demands if conceded will spell bankruptcy for many tramway undertakings unless they can largely increase their revenue. The position seems to be quite as acute as the corresponding one in the United States.

In this connection it may be noted that during February the Glasgow Town Council granted to all its employees a forty-eight-hour working week without reduction of pay and with increases in the war bonus raising it to a maximum of 30s. per week. It was stated that the change would mean in the tramway department an annual deficit of £40,000. This is in spite of the fact that the undertaking in the past has been so successful that it is in the unique position of having paid off all its capital liabilities, so that there are no payments for interest and sinking fund. The Glasgow fares are, however, so low at present that there is ample margin for raising them without difficulty.

#### FORTY-FOUR HOUR WEEK

The Town Council of Newcastle has granted a forty-four-hour week to all its employees, including the tramway men. These two cases are rather a break-away so far as tramways are concerned, because in the end of February negotiations were still going on between the two tramway associations of the country and the men's unions on the question of hours, and something like a deadlock had been reached.

The English Electric Company has gone to allotment. It consolidated under one direction and management the Coventry Ordnance Works, Dick-Kerr & Company, the Phoenix Dynamo Manufacturing Company, the United Electric Car Company and Willans & Robinson. About 90 per cent of the Dick-Kerr shareholders have accepted the offer to exchange their shares for shares in the new company. The authorized capital is £5,000,000 and the issued capital on allotment is just under £2,000,000.



# News of the Electric Railways

TRAFFIC AND TRANSPORTATION

FINANCIAL AND CORPORATE • PERSONAL MENTION • CONSTRUCTION NEWS

## Voting on City Ownership

Review of Terms Under Which Detroit People Are Asked to Sanction Municipal Ownership

Provided the agreement and a charter amendment accompanying it are approved by three-fifths of the electors (male and female) of Detroit, voting on the propositions on April 7, the contract for the purchase of the railway property of the Detroit United Railway will be effective, and the city will come into possession of the property on July 1, 1919.

### MANY LONG CONFERENCES

The purchase agreement entered into is the result of numerous sessions of great length during which practically every phase of the railway problem which has confronted the city for more than a score of years, was carefully considered.

The three possible methods of acquiring a railway system, i.e., purchase by agreement, condemnation and piecemeal construction, were earnestly weighed, and, with the advice of street railway experts, the Board of Street Railway Commissioners of the city unanimously concluded that the purchase by agreement plan was the most practicable and feasible method of affording relief from the conditions which have prevailed in the past.

The board says that in arranging the agreement every effort was made to safeguard the interests of the people of Detroit, and it requests that the voters study the agreement carefully and then express their preference at the election.

For the sum of \$31,500,000, of which \$15,000,000 is to be paid down on July 1, 1919, and the remainder on or before Dec. 31, 1931, the city of Detroit will acquire the railway property of the Detroit United Railway within the city of Detroit, the city of Highland Park, the village of Hamtramck and the township of Warren, Macomb County.

### WANTS APPROVAL OF \$24,000,000 OF BONDS

At the election on April 7, the voters will be asked to approve bonds to the value of \$24,000,000, to take care of the initial payment of \$15,000,000 on July 1 and to permit of the making of extensions, betterments and improvements to the railway system as now existing.

The city is to pay interest at the rate of 6 per cent on the unpaid portion of the purchase price (which is to come out of earnings) until the balance is fully liquidated, but it has the right to stop the running of interest by retiring

the outstanding bonds secured by mortgage upon the property at any time before Dec. 31, 1919, if it wishes to do so.

Upon conveyance and delivery of the railway system to the city, the Detroit United Railway is to be permitted to run its interurban cars into the city substantially as heretofore, on payment to the city of cost of the transferring of cars over the city's tracks, plus 30 per cent. At all times the entrance of these interurban cars into the city is to be under the reasonable control and regulation of the Board of Street Railway Commissioners.

The agreement between the city and the Detroit United Railway, relative to the compensation for use of the city's tracks by interurban cars, may be reviewed at five-year periods, and in case the city and company are unable to agree, the difficulties are to be submitted to the Michigan Railroad Commission for determination.

### INTERURBAN LINES FOR INTERURBAN PASSENGERS

Neither the city nor the company is to issue transfers for transportation of passengers over lines or on cars of the other party, and the interurban passenger cars are to carry only passenger traffic originating in the city districts for points beyond the city limits, and passenger traffic originating outside said city limits coming into the city.

## Important Power Plant Improvements

The St. Joseph Railway, Light, Heat & Power Company, St. Joseph, Mo., managed by Henry L. Doherty & Company, New York, N. Y., will spend \$1,000,000 on its plant, according to a communication submitted to the Council of St. Joseph by J. H. Van Brunt, general manager of the company.

All obsolete machinery will be replaced with new and modern apparatus and the capacity of the plant will be so enlarged as to remove all possibility of a recurrence of a breakdown such as occurred last winter. A new power house will not be built, but much new equipment will be installed. Additional pumps will be placed in service so that the company will not be forced to depend upon the city water plant for water. The consulting engineers for the company decided that a new plant could not be built before next winter but that improvements could be made to the present plant which will place it in good shape. Last winter the power plant interruptions greatly embarrassed the management and caused much financial loss to the company.

## Sliding Scale Commended

Mr. Babson Thinks Service-at-Cost Plan Needs to Include Incentive for Efficient Operation

Roger W. Babson of the information and education service of the Department of Labor, in recent articles in the *Washington Star*, suggested various possible cures for electric railway ills in the District of Columbia. The plans have been submitted to the Public Utilities Commission for consideration in connection with the application of the Washington Railway & Electric Company for financial relief.

### AGAINST MUNICIPAL OWNERSHIP

The plans mentioned by Mr. Babson include municipal ownership, service-at-cost, service-at-cost with a sliding scale of return, and partnership with the city. Mr. Babson characterized the first as tending eventually to uneconomical operation.

The service-at-cost plan, in Mr. Babson's opinion, would also lead to uneconomical operation because it lacks the salient feature of the plan recently proposed for the New Brunswick Power Company, St. John, N. B., as noted elsewhere in this issue. This feature is that an incentive for efficient operation is provided by including in the cost of service a sliding scale of return on investment, changing inversely with the rate of fare.

Discussing the advisability of a partnership plan, Mr. Babson said in part:

A loan of public funds or even the guarantee of securities seems somewhat out of the question for the present. The only other form of relief which seems practical would be to have a partnership arrangement entered into between the companies and the District of Columbia. By such an arrangement the companies would be allowed a dividend of, say 5 per cent on their stock, with the understanding that the net earnings over and above this amount would be divided fifty-fifty between the company and the district.

### IMPARTIAL ACCOUNTING NECESSARY

Such a system requires impartial accounting. Companies working under such partnership tend to put so much back into the property that there is never any excess to divide. This principle is all right, provided there be an increase of stock commensurate with the excess put back into the property, and that arrangements be made for the district to receive one-half of such stock increases.

Perhaps the most practical method of handling the situation at the present time would be along the lines of the national banking system. In the case of the banks, private interests are the stockholders and they are given a certain maximum and minimum leeway between which they can work. The capitalization always represents real money, and an effort is made by the government to enable the banks to make a fair rate of interest on this money and lay up a surplus besides. In return, however, the government makes a very careful examination of the banks and has a close supervision over them. This is primarily in the interests of the public, who are depositors in the bank, rather than in the interests of the stockholders.



## Temporary Aid for Connecticut

### Special Commission Proposes That Taxes Be Deferred for Two Years and That Jitneys Be Regulated

Eight recommendations for legislation designed to relieve electric railways in Connecticut were made to the State Legislature on April 1 by the special commission appointed to investigate the condition of the carriers. The recommendations cover, in general, a temporary deferment of taxes, a temporary positive relief from bridge and paving assessments, a regulation of jitneys and a grant for motor vehicle operation by railways.

The report was signed by Senator John B. Dillon, co-chairman; Senator C. E. Hough, Representative O. H. Beckwith, Representative J. T. McKnight, W. M. Waitt, I. M. Ornburn and F. R. Cooley. A supplementary report was filed by Messrs. Beckwith, Dillon and McKnight, in favor of a loan from the State. Dissenting reports were made by Representative S. C. Shaw, co-chairman; Senator W. C. Fox and Representative J. S. McCarthy.

#### CONTRIBUTING CAUSES

According to the majority report, 98 per cent of the 828 miles of electric railways in Connecticut are either in receivership or insolvency and must be partially or completely suspended or abandoned unless substantial temporary relief is given by the 1919 Legislature. Only the Bristol & Plainville Tramway is paying.

The vital causes contributing to this situation are said to be these:

1. War conditions.
2. Abnormal increase in wages.
3. Abnormal increase in cost of material.
4. Abnormal increase in cost of coal.
5. Taxation requirements of the State.
6. Paving assessments required by State laws.
7. Bridge assessments required by State laws.
8. Rapid development of unregulated jitney competition.
9. Operation of non-paying lines.
10. Depreciated purchasing power of the former unit of electric railway fare, the nickel.
11. Improved facilities required of companies.
12. Great increase in use of private automobiles.

The commission believes that some of the above named causes will adjust themselves within the next two years after the return to peace conditions, such causes as No. 1, No. 3 and No. 4. Within two years there may be a reduction in cost of material, and equitable means may be found for a decrease in percentage of cost of labor to the gross revenue. As to items No. 5 to No. 11 inclusive, however, the commission sees no hope for relief from the pressure and hindrance of these causes, except by means of definite and adequate legislation.

#### REMEDIES SUGGESTED

In the commission's opinion, the situation is so critical that it is a serious question whether the lines can be saved intact or not. It is necessary, therefore, at once to take steps along these recommended lines:

1. The suspension of any call or demand for the payment of taxes due to the State at the present time or which may become due up to the time of the rising of the General Assembly of 1921. A uniform rate of 5 per cent per annum [instead of 9 per cent] should accrue upon any unpaid taxes up to that time.

2. Complete relief, until the rising of the General Assembly of 1921, from all charges and the payment of all costs on bridge construction as assessed under the present State laws, except cost of maintaining the track and other railway equipment required by them for operation.

3. Complete relief, until the rising of the General Assembly of 1921, from all paving charges as called for by the present laws of the State, except the maintenance for 3 in. beyond the rails and except the replacement in a proper manner of any paving which the railways may remove or injure.

#### JITNEYS

4. The so-called jitney should be declared a common carrier and thereby be placed under the same control and supervision as the electric railways, so far as schedules, routes and rates are concerned; and under the commissioner of motor vehicles so far as licensing and providing security against damage to persons are concerned.

#### PERMISSION TO OPERATE MOTOR VEHICLES

5. Permission should be granted to the electric railways to operate a motor-vehicle service, and to abandon non-paying portions of their lines provided other adequate means for conveying the traveling public is furnished, all subject to the approval of the Public Utilities Commission.

6. Construction at the expense of the State, and under the supervision and approval of the highway commissioner, of the electric railway approaches to the New London bridge, the railway concerned to maintain the property and pay a rental of 10 per cent of the cost of construction to cover use and depreciation.

7. Permission should be granted to the Hartford & Springfield Street Railway to operate its cars over certain tracks of the New York, New Haven & Hartford Railroad.

8. Appointment by the Governor of an electric railway commission of three members to continue study and to report to the General Assembly of 1921 on conditions at the close of 1920, together with recommendations and necessary legislation required to place the railways upon a safe, fair and efficient operating basis. The commission should, if deemed desirable, have authority to engage a competent expert to make a careful appraisal of properties after July, 1920.

Bills have been submitted carrying out all the recommendations stated above, together with an additional one, providing that the State may lend not more than \$2,000,000 to electric railways, if necessary, and further providing for bond issues to raise the money, with the stipulation that the railways pay one-half of 1 per cent more interest to the State than the State would pay on the bonds. This last mentioned bill was drawn up by Messrs. Beckwith, Dillon and McKnight.

#### URGES PUBLIC CO-OPERATION

In closing its report the commission says:

We believe at present that in spite of many causes for criticism and complaint it is now the earnest effort and endeavor of the officials of electric railways to give the best service possible to the public, and we further believe that the operating officers, together with the Public Utilities Commission, will gladly endeavor to correct abuses and lacks in efficient service if the public will co-operate by bringing the just causes for complaint to their attention. We are not justified in expecting perfection in railway companies any more than in individuals, but by kindly co-opera-

tion much can be done by the public to help the operating officers in giving more satisfactory service.

The dissenting reports in the main favored merely a suspension of the bridge or paving assessments or both for two years, or until the rising of the next General Assembly, with a 5 per cent charge on unpaid assessments and a preferred lien in favor of the State on the companies' properties for the assessments.

## To Stimulate Business

### Utilities Committee Co-operates in National Campaign to Stabilize Trade at Present Prices

In an effort to stabilize prices, lower the cost of living and stimulate business reconstruction a "National Prosperity Campaign," under the chairmanship of Philip H. Gadsden, vice-president United Gas & Improvement Company and chairman of the National Public Utilities Committee, began on April 4. The object is to bring business men to the belief that it is within the power of industry to resuscitate itself.

According to a statement issued at the headquarters of the campaign, Room 700, Commodore Hotel, New York City, the stabilization of business at present price levels rests within the power of industry itself, is the belief of the National Federation of Building Industries. This is the message that is being forwarded to members of the War Service Committees and the Chambers of Commerce of the United States, as well as by leaders of business, by the "National Prosperity Campaign." The statement continues:

Regardless of government attitudes toward the present price situation, there is a realization of the necessity for the upkeep of production and the absorption of the unemployed, and the distribution of such propaganda as will stimulate confidence as well as activity in business projects. Several hundred firms throughout the country have wired their approval and co-operation.

It being granted that general retail buying by the ultimate consumer is still enjoying its usual boom even at present prices, the fact remains that industry has been waiting and is waiting for basic prices to strike a permanent level that would justify industry in going ahead and still be protected against loss by a drop in prices. Present prices are here to stay, so far as price levels are concerned; we cannot await the industrial adjustment of the entire world. Factory fires must be kept burning and wheels turning, and labor must be employed at a scale of wages commensurate with the prices of commodities.

Appeals have been sent to the Governors of the States and mayors of principal cities, requesting conferences with their business interests that are now awaiting building and highway construction.

The organizing committee of sponsors of the "National Prosperity Campaign" include the following: P. H. Gadsden, chairman; Milton E. Ailes, vice-president Riggs National Bank, Washington, D. C.; E. P. Albrecht, president Philadelphia Bourse; Joseph E. Davies, former chairman Federal Trade Commission; James H. McGraw, president McGraw-Hill Company, Inc., New York; Franklin T. Miller, president F. W. Dodge Company, New York; John Hays Hammond, Washington, D. C.; Cardinal Gibbons; Julius Rosenwald, president Sears Roebuck & Company.



## City Takes Over Railway

### Seattle on April 1 Formally Came Into Possession of Railway Lines of Puget Sound Company

Formal transfer of the railway lines of the Puget Sound Traction, Light & Power Company at Seattle, Wash., to the city took place on March 31. Superintendent of Public Utilities T. F. Murphine states that plans for operation by the city provide first for a physical connection between the already existing municipal lines and the traction lines, thus eliminating duplication of service, and also contemplate express or limited service from the outlying districts to the industrial districts, the adoption of traffic regulations, the elimination of present congestion on downtown streets due materially to parking of automobiles, and the installation of the skip-stop system.

#### PRELIMINARY OPERATING PLANS

The type of one-man cars now in use will be continued wherever practicable, with the installation of a larger type of one-man cars, and a campaign of power saving and the speeding up of the service. Car tickets will be done away with and the nickel made the standard and only fare, except for school children. All free riding will be abolished. Safety zones will be established, with the end in view of loading and unloading passengers more rapidly.

The sum involved in the transfer is \$15,000,000. The company accepts utility bonds against the property transferred in payment, and under the agreement with the city the Supreme Court has passed upon the validity of the securities to be taken in lieu of cash. A forty-five-day period was permitted in which the company was to clear the title of all incumbrances, this period to date from the day the Superior Court received the *remittitur* from the Supreme Court. When that is done the title of the property passes to the city and the \$15,000,000 of utility bonds are turned over to the company.

The purchase of the properties by the municipality was primarily the result of war emergency conditions. The company was confronted with the problem of meeting greatly increased costs of operation, increased interest rates for money needed for maturing bonds and notes and to keep pace with community growth and development and of meeting the competition of war industries for all labor required. Involved with this was the immediate future problem of expiring franchises.

#### EXPIRING FRANCHISE A PROBLEM

One of these problems might have been solved in part by increased rates of fare, but no fare within reasonable limits could have solved the other—the problem presented by the franchise tenure. It was impossible, as it proved, to solve even the problem of increased costs by any adequate proportionate increase in revenues, or such increases as would be possible only under proper

increase in rates of fare being charged.

A State statute, since amended, provided that no railway could charge a fare in excess of 5 cents for a continuous ride within the city limits of any city of the State, and continuous ride had been construed to mean and include any transfer to which the rider is entitled.

#### SUSPENSION NOT POSSIBLE

The company's first thought and effort was to have the City Council permit such temporary suspension of franchise requirements, by agreement between the city authorities and the company, as would allow the company to increase its rates of fare, but it was not possible to overcome all objections to that arrangement. In the meantime the labor problem was particularly pressing. Men were leaving the company's employ to work in the shipyards. Costs were mounting higher day by day and revenues were not increasing in any like proportion. The company could not increase fares, but the city as owner of the properties would not be bound by this rigid fare statute. It was at this juncture that the first suggestion was made that the city could solve the transportation problem by acquiring the railway lines. That suggestion came from Councilman R. H. Thomson as early as May 14, several months before it was considered seriously by the city, the company or the public.

On Aug. 13, after returning from Washington, where he had been in conference with the Capital Issues Committee and officials of the government's transportation and housing bureau, Mayor Hansen came out in a public statement declaring that the only solution of the transportation problem was for the city to acquire all of the railway lines in the city, consolidate them and operate them as a single publicly-owned, publicly-operated system.

#### PUBLIC SENTIMENT TESTED

On Sept. 6, after an all-day session of city officials and railway officials and representatives of the United States Shipping Board, the city made an offer of \$15,000,000 for all of the railway lines and railway operating property of the company within the limits of the city of Seattle. On Sept. 11 the company filed an answer accepting the offer.

The city officials, after entering into negotiations on the basis of the price offered, determined to have the authority of the people for its final consummation, and accordingly submitted the purchase question to an advisory referendum in the election of Nov. 5. The referendum carried by a vote of 29,726 to 8309. After obtaining this affirmation of the purchase by the people, the city officials felt freer to proceed with the details.

The offer made for the properties and the acceptance by the company was a general offer and a general acceptance based upon the ability of the city and the company to get together on all of the details. One by one these were agreed upon, by a process largely of give and take, and by both sides remaining on a common ground of mutual understanding and open and above-board dealing.

#### STATEMENT OF PROPERTY ACQUIRED

The city is acquiring from the company 194.08 miles of electric railway tracks and 8.60 miles of cable tracks, a total of 202.68 miles; 477 passenger cars, with twenty-seven motor-equipped freight and work cars and thirty-six freight and work cars without motors, or a total of 540 cars of all descriptions. There are thirteen other vehicles ranging from touring cars to tar wagons, and all of the railway distribution system, including trolley and span wires, poles, etc., together with the signal and interlocking apparatus used in train dispatching. There are seven carhouses and yards, three cable stations, freight sheds and freight terminals, smaller miscellaneous buildings and structures, many parcels of real estate and rights-of-way and thousands of tools of all descriptions, together with a large car repair shop and much land at Georgetown. Stores and supplies on hand go with the lines, where such stores and supplies are used exclusively for street car operation.

The city is acquiring a transportation system which carried last year about 117,500,000 passengers and with gross revenues for the year of about \$4,500,000.

As noted in the department "Personal Mention" elsewhere in this issue many important changes in personnel have followed the taking over of the lines by the city.

#### Company Withdraws from Employees' Association

An announcement posted in the carhouses and employees' waiting rooms of the Brooklyn (N. Y.) Rapid Transit System indicates that the company is prepared to comply with the recommendation of the War Labor Board to remove all company control over the Employees' Beneficial Association.

According to the posters, the company will hereafter allow the employees to elect their own president. In the past the president of the association has been appointed by the president of the Brooklyn Rapid Transit Company subject to confirmation by the trustees, five of whom were appointed by the company and five elected by the members of the association. The company also announces a new insurance scheme. It offers \$1,000 of life insurance to every employee, each employee to pay a flat rate of 25 cents a month, the company to pay the balance of his premium. It is figured the company's share of each premium will amount to from \$15 to \$25 a year, according to the age of the person insured.



## Boston Elevated Act Declared Constitutional

At the present session of the Massachusetts Legislature several bills authorizing the State to help defray part of the cost of electric railway transportation are under consideration, and before going farther with them the legislature thought it wise to learn whether such bills, if passed, as well as the existing Boston Elevated Railway act, were constitutional. Hence, on Mar. 12, the Senate asked the justices of the Supreme Court to decide four questions of law.

The first was whether Senate Bill No. 54 would be constitutional, if enacted. This provides in substance for a maximum fare of 5 cents on the Boston Elevated Railway, but if the income thus received shall be inadequate to meet the cost of service, the deficiency is to be made up to the company from the treasury of the Commonwealth and the sums so advanced shall be assessed upon the cities and towns in which the lines of the company operate.

The second question was whether House Bill No. 722 would be constitutional, if enacted. This bill aims to reduce fares on the Boston Elevated Railway by the payment by the state to the company of an amount equal to the rental due from it for the use of subways, and the assessment of the sum so paid in the same way as in the Senate bill already mentioned.

The third question was as to the constitutionality of Chapter 159, which is the law under which the Boston Elevated Railway is now being operated.

The fourth question was whether any part or parts of this law which have a direct relation to the validity of the two bills just mentioned were unconstitutional.

The court answered the first two questions by "yes" and the second two questions by "no." In other words, it declares the present law constitutional and that the bills, if enacted, would be constitutional.

## San Francisco Encroachment Case Argued

Senator Hiram Johnson of California appeared as chief counsel for the city of San Francisco when arguments were begun in the Supreme Court of the United States on March 25 on the right of the city to construct its own railway lines parallel to those of the existing lines owned and operated by the United Railroads, San Francisco. An appeal was taken by the private company from the lower federal court decrees dismissing injunction proceedings started by it to enjoin the city from constructing the proposed municipally-owned lines.

The case has aroused country-wide interest because of the important issue involved. In asking the Supreme Court to reverse the judgment of the lower courts, counsel for the company argues that the refusal of the lower courts to

enjoin the city impaired the company's contract and deprived it of its property without due process of law.

## Brooklyn Men Present Demands

The demands of the unionized employees of the Brooklyn Rapid Transit Company for increases in wages, shorter hours and various improvements of working conditions have been addressed to Lindley M. Garrison, the receiver. With the demands was sent a letter requesting that the members of the committee be permitted to appear in person before the receiver.

It is stated unofficially that motormen and conductors on the surface lines are asking 60 cents an hour for a nine-hour working day and time and a half for overtime. They also ask some sort of payment for time consumed in "swings" between working hours. Shop workers are asking for an eight-hour day at 45 cents an hour, with time and a half for overtime. Structural workers and blacksmiths want 53 cents an hour for a nine-hour day and time and a half for overtime.

No date has been set by the men for a reply to their request.

## News Notes

**City Will Take Over Railway.**—The Common Council of Niagara Falls, Ont., has notified the Niagara, St. Catharines & Toronto Railway that upon the expiration of the latter's franchise a year from now the city will take over the railway and operate it as a public utility.

**Ford Promises a "Flivver" Street Car.**—Announcement was made on April 3 by C. E. Sorenson, general manager of the Henry Ford & Son Tractor Company, that Henry Ford and other members of his tractor organization are now working on plans for a street car driven by an internal combustion motor which will demonstrate in Detroit this summer.

**Commission Control in North Dakota.**—Public utilities, including electric railways, have been placed under control and supervision of the State Railroad Commission in a bill passed by the Legislature and signed by the Governor. Publicly owned utilities are exempt. No rate for service fixed by legislation may be increased by the commission.

**Wage Increase Asked in Pittsburgh.**—The motormen and conductors of the Pittsburgh (Pa.) Railways have presented a new wage scale to the receivers, effective on May 1. A substantial increase in pay is asked, although neither the receivers nor the men have announced the details. The present

wages of the men are 42, 45 and 48 cents an hour.

**Wage Request Refused.**—F. R. Coates, president of the Toledo Railways & Light Company, Toledo, Ohio, at a conference on March 28 told the men the public would not stand a fare increase sufficient to meet the wage demand. He offered two counter propositions, both declared unsatisfactory by the unions. The employees demand a scale of from 50 cents to 60 cents an hour, and the electricians from 50 cents to 75 cents.

**Women Incident Closed.**—The Cleveland (Ohio) Railway considers the conductorette issue closed, John J. Stanley, president, announced on March 28. He is reported to have said: "We propose to take no action in the matter of reinstating the women, regardless of the action of the War Labor Board and the inquiries of the women. I said as much in my reply, dated Thursday, to an inquiry from Miss Rose Moriority, who has been championing the conductorette cause."

**Indeterminate Franchise Measure Defeated.**—After a bitter fight in which there were many hearings in the Twin Cities and before the Minnesota Legislature the Warner street railway bill was defeated in the House eighty-six to forty votes. The bill proposed dual control of the railways in the major cities. It was defeated because it appeared that control of the railways was removed to the State Railroad & Warehouse Commission, thus defeating operation of the home rule idea. The bill made it possible for a company to surrender its franchise and operate under a State license.

**M. O. Bill for Minneapolis.**—A bill has been introduced in the Legislature, authorizing Minneapolis to take over its railway lines and other property necessary to operate them under the right of eminent domain, as provided in the statutes through condemnation. It may assume outstanding debts and agree to pay those debts as part of the compensation to the company which created them. Provisions limiting a city's debt may be ignored in pledging the credit of the city and issuing bonds to buy the railway. Fares are to be fixed at a sum that will operate the property efficiently and pay interest on the indebtedness.

**Reports Against Purchase by Municipality.**—Thomas Bradshaw, financial expert of Toronto, Ont., engaged by the city of Ottawa, Ont., to inquire into the reasonableness or unreasonableness of the offer of the Ottawa Electric Railway to sell to the city at a price approximating \$6,500,000, has submitted his report. In his opinion, the company's offer is too high; the best interests of the city would be served by waiting until 1923 to acquire the enterprise. Mr. Bradshaw advises against proceeding with any valuation of the physical assets of the railway at the present time. Prices of both material and labor, he contends, will be cheaper several years hence.



# Financial and Corporate

## Chicago Loss Heavy

Lower Earnings and Higher Expenses  
Cause 25 Per Cent Loss in Residue  
of Surface Lines

The gross earnings of the Chicago (Ill.) Surface Lines in the fiscal year ended Jan. 31, 1919, suffered a decline of \$404,535 or 1.1 per cent, \$380,023 of this loss being in regular passenger earnings. This showing was made

dated June 1, 1917, which ran for a three-year period, or until June 1, 1920. These two wage increases, within a period of fourteen months, made an aggregate wage increase of more than \$1,700,000 a year.

The residue receipts of the combined surface lines, as a result of the adverse showing in both gross earnings and expenses, fell off \$3,034,777 or 25.2 per cent. The balance of \$8,978,161, was

TABLE I—REVENUES AND EXPENSES OF CHICAGO SURFACE LINES FOR YEARS ENDED JAN. 31, 1918 AND 1919

	—1919—		—1918—	
	Amount	Per Cent	Amount	Per Cent
Earnings:				
Passenger cars (including mail carriers)	\$34,186,578	98.50	\$34,566,601	98.44
Other sources	523,520	1.50	548,032	1.56
Gross earnings	\$34,710,098	100.00	\$35,114,633	100.00
Expenses:				
Maintenance	\$3,810,266	10.98	\$3,214,948	9.16
Renewals	2,776,808	8.00	2,835,636	8.08
Power—operation	2,841,211	8.18	2,558,192	7.28
Conducting transportation	12,477,148	35.95	10,802,009	30.76
General and miscellaneous, including Board of Supervising Engineers	2,366,504	6.82	2,197,908	6.26
Taxes	1,460,000	4.20	1,493,000	4.25
Total expenses of operation	\$25,731,937	74.13	\$23,101,695	65.79
Residue receipts	\$8,978,161	25.87	\$12,012,938	34.21
Divided:				
Chicago Railways, 60 per cent	\$5,386,897	15.52	\$7,207,762	20.52
South Side Lines, 40 per cent	3,591,264	10.35	4,805,175	13.69

worse by the accompanying advance in operating expenses.

Owing to wage increases and higher material costs, the operating expenses rose \$2,630,242 or 11.3 per cent during the last year. The largest item of increased expense was "conducting transportation," which jumped \$1,675,139 or 15.5 per cent.

Effective Aug. 1, 1918, the National

TABLE II—INCOME STATEMENT OF CHICAGO CITY RAILWAY FOR YEARS ENDED JAN. 31, 1918 AND 1919

40 per cent of the residue receipts of Chicago Surface Lines	\$3,591,264	\$4,805,175
Deduct joint account expenses, interest on capital investment of the Chicago City Railway, Calumet & South Chicago Railway and Southern Street Railway	3,580,613	3,661,805
Divisible income of Chicago City Railway	\$10,650	\$1,143,369
City's proportion, 55 per cent	5,857	628,853
Company's proportion, 45 per cent	\$4,792	\$514,516
Add interest on capital investment	2,668,657	2,623,510
Income from operation	\$2,673,450	\$3,138,026
Other income—deficit	7,046	58,356
Interest on bonds and notes outstanding	\$2,601,403	\$3,196,384
	1,755,217	1,695,000
Net income	\$846,186	\$1,501,384

War Labor Board awarded a wage increase amounting to \$3,700,000 a year. This was in addition to the wage increase of more than \$1,000,000 a year given the employees under the contract

divided 60 per cent or \$5,368,897 to the Chicago Railways and 40 per cent or \$3,591,264 to the south side lines; namely—The Chicago City Railway, the Southern Street Railway and the Calumet & South Chicago Railway.

The comparative figures of the Chicago City Railway for the last two fiscal years are given in Table II. A sign of the year's decline is shown in the fact that the city's 55 per cent share of the divisible income of this company amounted to only \$5,857 in the year ended Jan. 31, 1919, as compared to \$628,853 the year before.

After the payment of operating expenses and bond interest, the net income of the Chicago City Railway was reduced from \$1,501,384 to \$846,186. The item of other income last year, amounting to \$58,358, was more than balanced this year by the loss of \$82,625 in the ordinance 15 per cent on new construction, decrease in bank interest and other miscellaneous income. Three quarterly dividends were paid during the year, 2 per cent in March, 2 per cent in June and 1 per cent in September, the one due in December being passed.

At the present time the company is not earning the 5 per cent interest rate fixed by ordinance on its purchase price. In the last year the percentage of net income to capital stock at par was 4.7 per cent. The foregoing figure does not reflect the full result of the second wage increase, which was effective only during the last six months of the year.

## Public Service Losses

Operation in 1918 Resulted in Deficit of \$4,800 with Reduced Depreciation and No Stock Return

During the calendar year 1918 the Public Service Railway, Newark, N. J., without earning a dollar upon its nearly \$50,000,000 of capital stock,

TABLE I—INCOME STATEMENT OF THE PUBLIC SERVICE RAILWAY FOR 1918, WITH ADJUSTMENTS FOR ACCIDENTS AND DEPRECIATION

	Seven Months Ended July 31, 1918	Five Months Ended Dec. 31, 1918	Year 1918
Operating revenue	\$10,683,258	\$8,977,471	\$19,660,730
Maintenance (excluding power)	1,525,684	1,385,008	2,910,692
Other operating expenses	5,103,085	4,729,725	9,832,811
Depreciation		333,333	333,333
Taxes	927,281	644,741	1,572,022
Total	\$7,556,050	\$7,092,807	\$14,648,858
Net operating revenue	\$3,127,208	\$1,884,664	\$5,011,872
Other operating income	6,337	3,071	9,408
Operating income	\$3,133,545	\$1,887,735	\$5,021,280
Non-operating income	95,585	88,669	184,255
Gross income	\$3,229,130	\$1,976,405	\$5,205,535
Income deductions	3,029,989	2,180,368	5,210,357
Net income	\$199,141	\$*203,963	\$*4,822

\* Deficit.

showed a loss of \$4,822. During this period, too, the company set up only \$333,000 for depreciation instead of the \$800,000 desired. For seven months of the period a 5-cent fare was in effect; for five months, 1 cent for a trans-

TABLE II—OPERATING RESULTS OF THE PUBLIC SERVICE RAILWAY FOR FIRST TWO MONTHS OF CALENDAR YEAR 1919

	January	February	Total
Revenue from transportation	\$1,896,226	\$1,737,875	\$3,634,102
Revenue from other railway operations	40,446	40,059	80,504
Operating revenue	\$1,936,672	\$1,777,934	\$3,714,606
Operating revenue deductions	1,578,141	1,464,916	3,043,057
Railway operating income	\$358,531	\$313,018	\$671,549
Auxiliary operating income	405	433	839
Total operating income	\$358,936	\$313,451	\$672,388
Non-operating income	4,406	4,935	9,341
Gross income	\$363,342	\$318,386	\$681,729
Income deductions	429,333	434,842	864,175
Net income	\$*65,991	\$*116,456	\$*182,446
Car-miles	4,833,378	4,471,005	9,304,383
Car-hours	509,746	471,569	981,315
Federal income and profits taxes included above	\$5,402	\$11,322	\$16,724

\* Deficit.

NOTE—In the above figures no allowance is made for depreciation.

fer, and from Oct. 15 to Dec. 31, a 7-cent fare. Detailed results for the year are shown in Table I.

In January, 1919, the company, without setting up one dollar for deprecia-



tion, lost \$65,990. In February the company lost \$116,455. Detailed figures are given in Table II. These losses were incurred in an "open" winter, when the company was not troubled with snow removal and similar items.

The foregoing data were presented to the Board of Public Utility Commissioners of New Jersey by President T. N. McCarter at a hearing on March 26 in regard to the proposed zone system of the Public Service Railway. It will be recalled that the commission had granted a 7-cent fare effective until April 1, 1919, to pay fixed charges and make up back losses, with a 6-cent fare after this date to keep the company going.

The commission ordered the company, however, to investigate the possibility of a zone system and file a report by Jan. 1. The company was not able to complete its report and received two months' additional time. In filing its report it asked for an extension of the 7-cent fare period in case the new zone rates should not be allowed to go into effect on April 1 (the 6-cent fare has since been ordered restored).

At the hearing Mr. McCarter stated that if the new zone rates were suspended for the maximum period up to July 1, the loss for the first six months of 1919 would be \$145,580 with a 7-cent fare in operation for the whole period and \$334,041 with a 6-cent fare in effect between April 1 and July 1. These figures include \$400,000 or half of the current depreciation set-up for 1919 but not a \$200,000 loss from the recent strike.

Expenses Continue High

Higher Costs of Operation Cause London Street Railway to Suffer Small Loss in Net for 1918

The net income of the London (Ont.) Street Railway for the year ended Dec. 31, 1918, showed a loss of \$2,978 as compared to that for the preceding year. This loss was the direct result of the higher operating costs imposed upon the company during the year. The wage increase in May imposed an additional burden on the basis of \$37,500 a year. The operating cost per car-mile increased from 17.12 cents in 1917 to 20.37 cents in 1918, or an advance of 19 per cent. The operating cost per car-mile in 1915 was only 14.13 cents.

The gross earnings of the company for 1918 amounted to \$456,356, an increase of \$38,493 or 9.21 per cent. This gain, however, was more than counterbalanced by the heavier operating expenses. These totaled \$373,124, an advance of \$42,029 or 12.70 per cent. The net earnings from operation at \$83,232, therefore, showed a decrease of \$3,535, which was only partly affected by the decrease of \$557 in interest on bonds and floating debts, taxes, etc. Net income before providing for depreciation amounted to \$44,499, a decrease of \$2,978. The sum of \$29,208 was charged against net income for de-

preciation, and the balance of \$15,290 was transferred to surplus account.

Revenue passengers carried in 1918 were 12,322,170 as compared to 11,374,396 for the preceding year, and the average fare per revenue passenger was 3.65 cents as compared to 3.63 cents. Car-miles operated decreased from 1,933,557 in 1917 to 1,832,208 in 1918. Gross earnings per car-mile were 21.61 cents in 1917 and 24.91 cents in 1918. The gross earnings per mile of track were \$11,575 in 1917 and \$12,641 in 1918.

Milwaukee Costs Up

Operating Revenues Gained \$987,402, But Operating Expenses Rose \$1,309,088

The operating revenues of the Milwaukee Electric Railway & Light Company, Milwaukee, Wis., for the year ended Dec. 31, 1918, showed a gain of \$987,402, or 12.4 per cent., as compared to those of 1917. The operating reve-

lows: Railway, 20.12 per cent; electric light and power, 15.11 per cent, and heating, 13.09 per cent. The appropriations for maintenance and depreciation were maintained at a subnormal level during 1918 in order to stabilize net earnings pending the receipt of adequate fare relief from the Railroad Commission of Wisconsin.

The gross income available for the payment of interest and dividends was \$1,942,060, a decrease of 13 per cent compared with the corresponding amount in the previous year. Interest charges were increased because of the larger amounts of bonds and notes outstanding.

The expenditures during the year for additions, extensions and betterments to the plants and systems aggregated \$984,454. This amount does not include any additions through the purchase of the Commonwealth Power Company. Of this total \$452,607 is chargeable to the railway department.

In connection with the question of operating costs, James D. Mortimer,

COMPARATIVE INCOME STATEMENT OF MILWAUKEE ELECTRIC RAILWAY & LIGHT COMPANY FOR YEARS ENDED DEC. 31, 1917 AND 1918

	1918		1917	
	Amount	Per Cent	Amount	Per Cent
Operating revenues.....	\$8,955,595	100.0	\$7,968,192	100.0
Operating expenses.....	7,147,827	79.8	5,838,738	73.3
Net operating revenues.....	\$1,807,768	20.2	\$2,129,454	26.7
Non-operating revenues.....	134,292	1.5	108,127	1.3
Gross income.....	\$1,942,060	21.7	\$2,237,581	28.0
Interest charges.....	1,224,258	13.7	931,361	11.7
Net income.....	\$717,802	8.0	\$1,306,200	16.3
Credits to surplus.....	192,709	2.1		
Total.....	\$910,511	10.1	\$1,306,200	16.3
Dividends on preferred stock.....	270,000	3.0	270,000	3.4
Dividends on common stock.....	620,550	6.9	1,034,250	12.9
Surplus for year.....	\$19,961	0.2	\$1,970	0.0

nues of the railway department amounted to \$5,365,805, an increase of \$412,449, or 8.3 per cent. Those of the electric and heating department amounted to \$3,589,789, an increase of \$574,953, or 19.1 per cent.

On the other hand, the high costs of material and labor referred to in the preceding year's annual report reached higher levels during 1918. While op-

erating revenues increased \$987,402, operating expenses rose \$1,309,088. No detailed operating expense figures are presented in the 1918 report.

STATISTICAL DATA OF MILWAUKEE COMPANY FOR 1917 AND 1918

	1918	1917
Receipts per mile of track operated.....	\$29,753	\$27,460
Revenue passengers carried.....	114,149,000	115,626,143
Transfer passengers carried.....	45,709,197	47,232,242
Per cent transfer to revenue passengers.....	40.04	40.85
Receipts per revenue passenger.....	\$0.0466	\$0.0425
Revenue car hour operated.....	1,847,403	1,862,456
Receipts per revenue car hour.....	\$2.90	\$2.66
Revenue car miles operated.....	16,591,121	16,670,189
Receipts per revenue car mile.....	\$0.3234	\$0.2971

erating revenues increased \$987,402, operating expenses rose \$1,309,088. No detailed operating expense figures are presented in the 1918 report.

The appropriations for maintenance and depreciation of physical property in percentages of the operating revenues of the various utilities were as fol-

Newspaper Favors Customer-Ownership Plan

In the March "Investors' Guide" column the Chicago Tribune said:

A study of the list of several hundred cities where traction and other utility companies have obtained increased rates in the last year tends to confirm the opinion that people should invest their money at home. Companies whose securities are held largely by residents of their respective localities have fared better than others. The reason for this is plain. If a considerable number of citizens of a town own stock and bonds of its railway the rate-making board cannot help seeing that to refuse a necessary increase will be merely to take the property of part of the citizens and gradually distribute it to the others until bankruptcy stops the process. The people whose property is imperiled are on the ground where they can and do use their influence in protecting their interests.

Rate-making boards, of course, should act as courts of justice and treat both sides fairly. It seems, however, that in practice they often follow the line of least political resistance and sacrifice the just claims of unknown owners in order to grant unjust demands of insistent patrons.

The investor who owns bonds of a company in a distant state is negligible, but the man whose money is invested in home companies must be considered.



## Reorganization Bill

### Incorporation Act for Successor to Rhode Island Company Is Now Before State Legislature

A bill has been presented in the House of Representatives of the General Assembly of Rhode Island by Mr. Mitchell, Providence, which provides for the creation of a new corporation, designated the United Electric Railways, designed to take over all the property and privileges of the subsidiary companies which now lease their lines to the Rhode Island Company.

The bill, which is in tentative form so far as the incorporators are concerned, was presented at this time as the General Assembly adjourns in May for two years and it was regarded as essential to secure the necessary authority to form a new corporation, the details to be worked out as soon as possible by the general committee appointed by the receivers of the Rhode Island Company for the purpose.

The three incorporators named are Governor R. Livingston Beekman, Tax Commissioner Zenas W. Bliss, who is also one of the receivers, and Bank Commissioner George H. Newhall. The capital stock is stated as \$500,000. The receivers of the Rhode Island Company are authorized to accept securities of the new company in payment. The act specifically contains the proviso that one of the directors shall be appointed by the Governor of the State. The presentation of the bill in its present form, with State officials named as incorporators, delegates to the State the title to the charter and thus a measure of supervision of the proposed reorganization is obtained.

The first step in the reorganization will consist in determining the values of the property of the several lessor companies and the proper compensation which will be paid to each for the surrender of its holdings. When the reorganization is completed to the satisfaction of the Governor and State authorities, the charter of the new corporation will be turned over. The charter was drawn by Attorney-General Herbert W. Rice and it is regarded as certain that the measure will be passed by the Legislature without material changes in form. The new company is required to take over all or none of the subsidiary properties, subject to the approval of the Attorney-General.

### Jacksonville Bondholders Organize

The Jacksonville (Fla.) Traction Company is face to face with the matter of a heavy increase in expenses. In the interval of four years from 1914 to 1918, the gross earnings have increased \$230,314 or 32 per cent, but the balance remaining after fixed charges has decreased \$57,723 or 61 per cent. It is estimated that if the present rate of wages and present prices of coal and materials continue the company in 1919 with gross earnings of about \$1,000,000

will fail by about \$40,000 to earn the interest on its outstanding bonds and notes.

Every effort has been made to secure an increase in fare, but several more months may be required to bring about this result. In the meantime the company is clearly in no position to refinance its maturing notes. To protect the notes a committee composed of Boston bankers has been formed and to the members so far selected will probably be added a fifth member to represent banks in Jacksonville which hold notes of the company.

The deposit agreement covers a period of six months, after which time the depositor may at his option withdraw his notes unless a plan has been submitted and approved. The tentative agreement provides that no settlement or adjustment of the fare situation shall be made which does not result in the payment of all notes at par and interest thereon without first giving notice to the noteholder and submitting to them the plan proposed so that they may withdraw should they disapprove of the plan.

The company is now charging a 5-cent fare in accordance with the specific provisions of its city franchise. The city charter requires all franchises or amendments thereto, secured by city ordinance, to be ratified by popular referendum.

### Terms of Paducah Reorganization Announced

The committee representing the bondholders of the Paducah Traction & Light Company, Paducah, Ky., have worked out a tentative plan for the reorganization of that company. It is proposed to incorporate the Paducah Electric Company, Inc., probably under the laws of Kentucky, to acquire the electric light and power properties, the gas properties, steam mains, etc., in Paducah, and all the stock, bonds, etc., of the Paducah Railway, Inc., a new company, which in turn will own in fee the railway property and the stock, etc., of the Paducah Realty Company.

The Paducah Electric Company, Inc., will issue the following securities: \$536,000 of first mortgage bonds, \$576,000 of 6 per cent twenty-year convertible debentures and \$605,000 of capital stock, of a par value of \$25 for each share. The holders of securities of the Paducah Traction & Light Company will receive (1) for each \$1,000 Paducah Traction & Light Company bond, \$600 of Paducah Electric Company, Inc., 6 per cent debentures and \$500 of Paducah Electric Company, Inc., capital stock, being twenty shares at the par value of \$25; (2) for each share of preferred stock of the Paducah Traction & Light Company one share of the capital stock of the Paducah Electric Company, Inc., par value \$25.

The bondholders and stockholders of the Paducah Traction & Light Company who desire to secure the benefit of this plan are asked to notify Stone & Webster, Boston, the deposit managers.

## Consolidation Announcement

### Reorganization Plan at Scranton and Binghamton Provides for New Company to Take Over Existing Lines

The plan adopted by the protective committee representing the bondholders of the Scranton & Binghamton Railroad, Scranton, Pa., is said to provide for the consolidation of the Scranton & Binghamton Traction Company, the Northern Electric Street Railway and the Binghamton Railway, all controlled by the former company.

#### FORECLOSURE FIRST

It is proposed as a first step to foreclose the mortgage, sell the property and incorporate a new company with \$5,000,000 of first-mortgage 6 per cent thirty-year coupon bonds, with a sinking fund provision beginning on April 1, 1930. These bonds will be dated April 1, 1919, and subject to the existing Northern Electric mortgage, covering the property from Providence Square to Lake Winola and Montrose and 26 miles to be built from Tiffany Junction to Binghamton.

The committee announces that it will reserve the right to change capitalization to such extent as may seem wise in its judgment, without affecting the proportions to bondholders of the Scranton & Binghamton Railroad Company and stockholders of the Northern Electric Company.

It is further advised by the committee in order to cover the immediate financial requirements of the company, that the bondholders shall take and pay for 20 per cent of the par value of their present holdings of bonds in the proposed new bond issue of the successor company.

In the plans it is specified that the mortgage shall contain a provision for the issuance of additional bonds under proper restrictions and safeguards as may be necessary and advisable for further development, extensions and improvements and for the acquisition of property, and for the issuance of \$400,000 of income bonds and \$3,000,000 of common stock.

#### \$989,000 NEEDED

The committee believes that the earnings will more than provide the interest charges on the first mortgage bonds issued when all of the improvements have been completed and that the returns will also be sufficient to care for a sinking fund, assure the payment of interest on the income bonds and dividends of 6 per cent on preferred stock and leave the balance of net earnings to the common stock. The immediate requirements under this plan are approximately \$989,000.

The chief engineer's estimate of the cost of extending the railroad from Tiffany Junction to the New York State line, 16 miles, is \$494,494. Preliminary surveys have been made of the proposed route for this extension on options taken on much of the necessary right-of-way.



## Receiver Made Permanent

Federal Judge Julius M. Mayer on March 31 issued an order appointing Job E. Hedges permanent receiver of the New York (N. Y.) Railways. William P. Burr, the City Corporation Counsel, did not oppose the order, but appeared to urge that the financial difficulties of the company be met by reducing the rentals it pays to the companies from which it leases railway lines and not by abolishing transfers or raising fares.

Judge Mayer said that the question of fares, transfers and rentals would be determined in accordance with the facts developed under the receivership. If it were found that the elimination of transfers or the increase of fares was necessary to keep transportation systems in New York alive, the court said that the people of the city would favor this remedy. Judge Mayer is quoted as follows:

In respect to the financial situation, I have been extremely careful to say nothing on the much-mooted question as to the increase of fares. When all the facts are clearly understood, then it will be found out what is the right thing to do. If increases of fare are unnecessary, all will understand it. If increases of fare prove to be necessary after full and fair discussion, I am convinced that the public of New York is so fair and reasonable that it will not hesitate in making it known that it desires the remedy of increased fares to be adopted.

## Financial News Notes

**Would Issue \$200,000 of Bonds.**—The Trenton & Mercer County Traction Corporation, Trenton, N. J., has asked the Board of Public Utility Commissioners for permission to issue \$200,000 of bonds to pay back taxes and to provide funds for several improvements requested by the board.

**Receivers File Inventory.**—The fixed capital of the plant and equipment of the Memphis (Tenn.) Street Railway is given at \$15,803,469 in an inventory of the company's property which T. H. Tutwiler and Frank S. Elgin, receivers, have filed in the Federal Court. The report comprises 292 typewritten pages. Funds turned over to the receivers on Jan. 20 are given as \$105,475, including \$92,265 on deposit at the Union & Planters Bank.

**Fare Bill Reported Favorably.**—The Martin bill has been reported out by the judiciary committee of the New York Assembly. This measure is designed to amend the public service commission law by extending the jurisdiction of the commissions over the rates on electric railways fixed by agreement with local authorities, notwithstanding fare limitations in the franchises. The hearing on this bill was reported at length in the *ELECTRIC RAILWAY JOURNAL* for March 15, page 542.

**Slow Progress on Cleveland Fund.**—The report of the Cleveland (Ohio) Railway for the month of February showed the interest fund total was \$136,246 on March 1. When this fund reaches \$700,000 the fare is automatically reduced. The report also showed that during February 28,848,038 passengers were carried on cars covering 2,675,061 car miles. This is a decrease of 3 per cent from the passengers carried in February, 1918, but only 0.13 of 1 per cent in service.

**Receiver at Pascagoula.**—Judge E. R. Holmes of the Sixth United States District Court of Mississippi has appointed L. J. Fohr receiver of the Pascagoula Street Railway & Power Company, Pascagoula, Miss. The receiver was formerly general superintendent of the company. The receivership followed a petition filed on March 25 by the Columbia Finance & Trust Company, Louisville, Ky., representing as trustee the holders of \$350,000 of the company's bonds on which interest is in default.

**Will Abandon Rather Than Pave.**—Rather than stand the cost of paving between tracks under the contemplated improvement campaign this year, the Utah Light & Traction Company, Salt Lake City, Utah, will abandon some of the lines, according to a notice served upon the City Commission. In a letter sent to the commission, the company declares its intention of asking the Public Utilities Commission for permission to abandon and tear up the lines where the expenditure of the proposed paving cost would be unwarranted.

**Bond Extension Arranged.**—Arrangements have been completed whereby the \$500,000 of first mortgage bonds of the Cleveland, Painesville & Eastern Railway, Willoughby, Ohio, and the \$1,131,000 of first consolidated mortgage 5 per cent bonds maturing on Oct. 1, 1918, have been extended for five years to Oct. 1, 1923, at 7 per cent interest. As explained in the *ELECTRIC RAILWAY JOURNAL* for Sept. 28, 1918, the company found that it was practically impossible to refund the indebtedness at that time and the only course possible was to provide for an extension to Oct. 1, 1923.

**Kansas Road Suspends.**—Acting on directions of the general office in St. Louis, L. E. Lanigan, superintendent of the Iola (Kan.) Electric Railroad, on March 21 ordered the suspension of the city and interurban lines connecting Iola with Gas City, La Harpe and Bassett. Rising cost of operation, coupled with the failure of the company's gas field, depriving it of cheap power, are given as the cause of the shutdown. The Kansas Public Utilities Commission has announced that the railway acted illegally in suspending the operation without first seeking permission of the commission.

**Another Six-Cent Fare in Lockport.**—The Public Service Commission for the Second District of New York has passed an order authorizing on April 1 a 6-cent fare on Buffalo, Lockport &

Rochester Railway cars and its successor in Lockport, to remain in effect for one year and thereafter until further order of the commission. Transfers are not affected by the order. There was no opposition at a hearing before Chairman Hill at Buffalo to the complaint of the company that a 5-cent fare did not yield sufficient compensation for the service rendered. The company operates in Lockport on the International Railway's tracks. The latter is now charging a 6-cent fare.

**Must Restore Streets After Dismantlement.**—The Illinois Public Utilities Commission has issued an order that the Alton & Jacksonville Railway, which operated between Alton and Jerseyville, cannot completely dismantle its lines until it has restored streets in the city of Alton and has paid \$338 due for taxes. The company was authorized in 1917 to abandon operation. It recently asked for an order from the commission to remove additional equipment. Objections were made and a hearing was held, showing that taxes had not been paid and that portions of streets in Alton which had been torn up by employees of the company had not been replaced. The company has ninety days in which to comply with the order of the Public Utilities Commission.

**B. R. T. Interest Payment Postponed.**—Judge Julius M. Mayer, in the Federal District Court at New York, has set May 5 for further hearing on the recommendation of the referee in the Brooklyn (N.Y.) Rapid Transit Company receivership for payment of interest on the \$7,000,000 of Brooklyn Rapid Transit first gold 5 per cent bonds due on April 1. Ex-Judge E. Henry Lacombe, special master in the case, recommended to Lindley M. Garrison, receiver of the railway, that payment on these bonds be deferred for ninety days and added that the postponement of the paying of interest did not constitute a default. Judge Mayer, in extending the hearing, remarked that it would give those most concerned ample time to consider the matter and that it would not result in working any hardships to anyone.

**Chicago City Dividend Resumed.**—According to the *Wall Street Journal* there has been much comment over the resumption of dividend payments by the Chicago City Railway. That paper says: "It is understood that the only reason the company recently declared a dividend distribution was that failure to pay a dividend would mean default on the interest on the Chicago City & Connecting Railways 5 per cent collateral trust bonds and foreclosure on the collateral. These bonds are secured by deposit of a large part of the Chicago City Railway stock. The dividend declaration is regarded as a temporary expedient to avoid default on the collateral trust bonds as long as there remains a chance of the company obtaining an increase in fare. The next interest payment on the bonds is due April 1."



**Damages Claimed Under Lease.**—A suit for \$100,000 against the Rhode Island Company, Providence, R. I., has been filed in the Superior Court of Rhode Island by the Narragansett Pier Railroad. The basis of the suit is the claim of the plaintiff company that its property leased to the Rhode Island Company had deteriorated to the extent of \$64,000, this being represented by damage to roadbed of \$30,000, to rolling stock \$24,000 and to bridges, sidings and stations \$10,000. In addition to the damage alleged to have resulted during the lessee's tenancy, the declaration recites that taxes amounting to more than \$6,000 remain unpaid by the Rhode Island Company, although subject to accrued interest at the rate of 10 per cent. The writ bears the date of Jan. 27, three days prior to the filing of a petition for the appointment for a receiver to take charge of the Rhode Island Company.

**Valuation Hearings Resumed.**—The hearing that is to fix the valuation of the Capital Traction Company's property for rate-making purposes was resumed on March 25 before the Public Utilities Commission of the District of Columbia at the point where it was discontinued before the war. The company introduced evidence as to increased costs due to the war and arguments were commenced by G. Thomas Dunlop, counsel for the company. When he concludes, the commission is expected to take the case under advisement. Reproduction cost of the physical plant had been agreed upon before the war by the commission and company experts as \$10,966,214. Evidence on March 25 was to the effect that the cost of reproduction at present prices would be 100 per cent above this figure. Company experts contended that at least 40 per cent of this increase would be permanent.

**Equipment Trust Certificates Offered.**—The \$1,000,000 of equipment trust certificates for the Cincinnati (Ohio) Traction Company, which was referred to in the ELECTRIC RAILWAY JOURNAL for March 22, page 621, are being offered for subscription by the bond department of the Fifth-Third National Bank,

Cincinnati, the prices ranging from \$100 to \$98.16 and interest, yielding from 5 per cent to 6.25 per per cent, according to maturity. The certificates are dated April 1, 1919, and mature at the rate of \$50,000 each April and October from Oct. 1, 1919, to April 1, 1929. The total issue is \$1,000,000, known as series G-1. The certificates are in the denomination of \$1,000. The principal and interest are unconditionally guaranteed by the Cincinnati Traction Company. The equipment by which they will be secured will include 105 44-ft. pay-within, double-truck closed motor cars, costing about \$1,250,000. The title of these cars will be vested with the trustee until the entire issue of equipment notes has been paid.

**Receiver Asks State Aid.**—Reference was made recently in the ELECTRIC RAILWAY JOURNAL to the conditions of competition from jitneys under which the Danbury & Bethel Street Railway, Danbury, Conn., is operated. At the recent general hearing at Hartford to inquire into electric railway conditions throughout the State Judge J. Moss Ives, receiver of the company, summarized the situation confronting the Danbury & Bethel Street Railway as follows: "We practiced economy in every way but the State wants \$26,000 taxes, and I don't know how I can pay the money and I don't see how I can go on operating the road. I have asked to have the taxes abated. We need money to repair our roadbed and rolling stock. It is sound public policy to grant us this relief. I think the State tax should be based on net earnings, not gross earnings. Certainly it isn't fair to impose \$26,000 tax on a road which is barely paying operating expenses. If the State insists on the tax being paid the road will have to be sold. We also have got to have relief from jitney competition."

**Asks Permission to Abandon.**—Declaring that the traffic and freight handled on the Hamilton branch of the Sacramento (Cal.) Northern Railroad does not justify its maintenance, the company has asked the California Railroad Commission to make permanent

the order issued by the commission in 1913, temporarily suspending the operation of the branch. The company would except from the provision of the order approximately 2 miles of trackage running out of the city of Chico, which it would use during July, August, September and October, as a spur track for freight. The branch from Chico to Hamilton is 11.1 miles in length. The company contends that to operate the line successfully it will require the construction of a drawbridge over the Sacramento River at a cost of \$400,000, an expense not justified by the business in sight. When the line was in operation the river was crossed by means of a trestle with a pontoon span, which the company had to remove every year (in December) because of high water. In the winter of 1914 more than 1 mile of track on the west side of the river and three quarters of a mile on the east side were washed out.

**Conference on Reorganization.**—There was a conference before the Public Service Commission for the Second District of New York on March 27 upon the proposed reorganization of the Buffalo, Lockport & Rochester Railway, which was sold at mortgage foreclosure on March 12. The conference was in anticipation of a formal application to be made to the commission by the reorganization committee and, as Chairman Hill expressed it, to save time. It was stated among other things that there is \$4,000,000 in preferred and common stock of the old company holders of which as noted recently in the ELECTRIC RAILWAY JOURNAL will not participate in the reorganization. Mr. Ingham and Mr. Steele, who have joined the reorganization agreement and deposited their stock, objected to the plan on which it is proposed to proceed. They claimed that the new company should put a mortgage on the property and issue bonds as at present, or that the contemplated preferred stock issue should contain the privilege to holders to convert their stock into bonds. Objection was also made as to the expense of the reorganization. The commission still has the matter under consideration.

## Electric Railway Monthly Earnings

### COLUMBUS (GA.) ELECTRIC COMPANY

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Jan., '19	\$121,784	\$59,006	\$62,778	\$34,944	\$27,839
1m., Jan., '18	108,978	*41,606	67,372	31,893	35,474
12m., Jan., '19	1,194,219	*584,714	609,505	400,236	209,269
12m., Jan., '18	1,115,436	*428,885	686,551	362,475	324,076

### EASTERN TEXAS ELECTRIC COMPANY, BEAUMONT, TEX.

1m., Jan., '19	\$110,965	*\$67,920	\$43,045	\$14,041	\$29,128
1m., Jan., '18	84,459	*47,767	36,692	13,029	23,663
12m., Jan., '19	1,158,258	*682,312	475,946	164,711	311,235
12m., Jan., '18	943,181	*524,581	418,600	140,522	278,078

### FEDERAL LIGHT & TRACTION COMPANY, NEW YORK, N. Y.

1m., Dec., '18	\$337,559	*\$215,967	\$121,592	\$40,404	\$81,188
1m., Dec., '17	307,865	*212,254	95,611	50,970	44,641

### INTERBOROUGH RAPID TRANSIT COMPANY, NEW YORK, N. Y.

1m., Jan., '19	\$3,813,648	*\$2,660,656	\$1,152,992	\$1,540,218	†\$341,557
1m., Jan., '18	3,569,021	*1,964,320	1,604,701	1,170,105	434,620
12m., Jan., '19	23,766,807	*16,668,380	7,098,427	10,280,084	†2,818,389
12m., Jan., '18	23,238,037	*15,059,033	8,179,004	7,652,190	†526,814

\* Includes taxes. † Deficit ‡ Includes non-operating income.

### JACKSONVILLE (FLA.) TRACTION COMPANY

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Jan., '19	\$85,867	*\$77,984	\$7,883	\$17,074	†\$9,191
1m., Jan., '18	65,576	*47,060	18,516	15,866	2,650
12m., Jan., '19	965,879	*720,590	245,289	200,276	25,013
12m., Jan., '18	704,519	*478,449	226,070	189,214	36,856

### NEW YORK (N. Y.) RAILWAYS

1m., Dec., '18	\$979,862	*\$876,675	\$103,187	\$276,725	†\$130,325
6m., Dec., '17	918,775	*762,955	155,820	282,419	†\$66,918
6m., Dec., '18	5,598,834	*4,932,233	666,601	1,667,306	†\$238,127
6m., Dec., '17	6,306,105	*4,698,063	1,608,042	1,691,167	†\$115,567

### NORTHERN TEXAS ELECTRIC COMPANY, FORT WORTH, TEX.

1m., Jan., '19	\$44,489	*\$161,773	\$82,716	27,967	†\$6,731
1m., Jan., '18	250,311	*149,492	100,819	28,790	†\$1,512
12m., Jan., '19	2,923,937	*1,896,114	1,027,823	336,965	†\$688,858
12m., Jan., '18	2,661,325	*1,489,941	1,171,384	348,303	†\$861,414

### PENSACOLA (FLA.) ELECTRIC COMPANY

1m., Jan., '19	\$50,495	*\$39,943	\$10,552	\$9,137	\$1,415
1m., Jan., '18	37,143	*25,421	11,722	7,960	†\$3,763
12m., Jan., '19	519,402	*\$374,904	144,498	101,100	43,392
12m., Jan., '18	360,555	*\$213,448	147,107	93,824	53,288



# Traffic and Transportation

## Atlanta Fares Again

Company Renews Its Appeal for Relief Following Court Decision Establishing Authority of Commission

On account of the recent fare decision by the Supreme Court of Georgia affecting the Georgia Railway & Power Co., Atlanta, Ga., to which reference was made in the ELECTRIC RAILWAY JOURNAL for March 22, page 622, the fare matter in Atlanta has again come before the Railroad Commission of Georgia. A petition from the representatives of the city sets forth that the plea of a war emergency argued before the commission by representatives of the Georgia Railway & Power Company at the first hearing of the case no longer applies, and the company is not entitled to the increase. The city asks the commission to have an expert appraisal and inventory made of all the company's properties, including those of the Georgia Railway & Electric Company and the Atlanta Gas Light Company, and likewise an expert audit of the books of the companies by the Railroad Commission.

### COMPANY REOPENS CASE

The appeal by the city for an appraisal and audit is based on the petition now pending before the commission by the company to increase fares in Atlanta and vicinity. This petition by the company reopening the case follows the recent ruling by the Supreme Court to the effect that in the absence of a valid contract and ordinance on the subject of fares it was the duty of the Railroad Commission to fix and determine rates on appeal to it.

On Aug. 14, 1918, the commission ruled that it had no jurisdiction on account of certain contracts between the petitioner and the cities of Atlanta, College Park and Decatur, but it recommended that the company be permitted to charge a 6-cent fare.

### SOUGHT TO COMPEL ACTION

The Georgia Railway & Power Company instituted mandamus proceedings against the commission with the object of compelling the commission to assume jurisdiction of its petition and decide the case. The contention of the petitioner was that no contract existed between it and the city of Atlanta fixing fares therein, and that in any event such a contract would be invalid just as, in the cases of College Park and Decatur, it contended no valid contracts could be made by such municipalities pertaining to the rates of fare to be charged by railways serving them.

The Superior Court of Fulton County, to which the application for a writ of mandamus was made, refused the issuance of the writ, holding that a con-

tract fixing fares existed in the case of Atlanta as well as in the case of College Park and Decatur, and that all of such contracts were valid.

On March 15, 1919, the Supreme Court of Georgia reversed in part the conclusions of the Superior Court of Fulton County, and held that there was no contract between the city of Atlanta and the power company fixing fares within Atlanta, while there was as to transfers, but that there were contracts between the company and the towns of College Park and Decatur and that such contracts are valid. The commission was accordingly held to be without jurisdiction over the rates of fare prescribed in such contracts with College Park and Decatur, but was held to have jurisdiction over the rates of fare within the city of Atlanta, but not as to transfers.

At the time the decision of the Supreme Court was handed down P. S. Arkwright, president of the company, said that although the war was over, labor and material costs showed no decrease. It was his opinion that the commission would, therefore, follow its original recommendation with an order for higher fares.

## Zone Fare and Service Studies in Boston

Pending a decision by the Supreme Court of Massachusetts as to the constitutionality of the Boston Elevated Railway public control act, no further steps are being taken toward the installation of the zone-fare system lately described in these columns. The trustees of the company, however, are giving considerable thought to the zone system and have determined that to install it would cost the company considerably more than \$100,000.

There is no immediate probability of an increase in fare unit above the present 8-cent charge, although it is reported that the wages committee of the employees' union has formulated a demand for a maximum of 73 cents an hour and an eight-hour day in place of the existing maximum of 48 cents for surface line motormen and 50 cents for rapid transit motormen. The wage agreement between the company and the union expires on May 1.

Two bills are pending in the Legislature which are also tending to hold back the trustees from inaugurating a zone-fare system. One of these, sponsored by Senator Walsh, establishes a 5-cent fare unit for the system, leaving the deficit to be supplied through community taxation, and the other, fathered by Representative Hays, prohibits the institution of any zone system of fares. In legal circles it is expected that the constitutionality of the Boston public control act will be affirmed.

## Higher Fares in 378 Cities

More than 53 Per Cent of Urban Population Is Now Paying More for Car Rides

Recently granted increases in fares, according to the information bureau of the American Electric Railway Association, bring the total number of cities which are paying increased fares to 378, representing more than 53 per cent of the urban population of the United States. Additions to published lists previously compiled are as follows:

City	Population
Ten-cent Fare Granted:	
Albany, Ga. ....	10,979
Seven-cent Fare Granted:	
Oil City, Pa. ....	20,162
Northampton, Mass. ....	20,006
Temple, Tex. ....	13,904
Portsmouth, N. H. ....	11,730
Franklin, Pa. ....	11,555
Merrill, Wis. ....	8,798
Belton, Tex. ....	4,164
Six-cent Fare Granted:	
Springfield, Ohio ....	52,296
Springfield, Mo. ....	41,169
Hazleton, Pa. ....	28,981
Lockport, N. Y. ....	20,928
Eau Claire, Wis. ....	18,887
Athens, Ga. ....	18,319
Rome, Ga. ....	15,607
Manitowac, Wis. ....	13,931
Chippewa Falls, Wis. ....	9,476
Valdosta, Ga. ....	7,656
Houghton, Mich. ....	5,113
Five-cent Fare; Reduced Rate Tickets Abolished:	
Dayton, Ohio ....	268,439
Richmond, Va. ....	158,702
Roanoke, Va. ....	46,282
Lorain, Ohio ....	38,266
Wausau, Wis. ....	19,666
Grand Rapids, Wis. ....	6,521

To date twenty-eight cities are paying a 10-cent fare, and eighteen an 8-cent fare. Ninety-six cities pay a 7-cent fare, seventeen of which also pay an extra 1-cent for each transfer issued. One hundred and sixty-two cities pay a 6-cent fare. The remaining cities are paying increased fares either through a zone system, an additional charge for transfers or the abolition of reduced rate tickets.

## I. R. T. Breaks Traffic Records

According to figures furnished to the Public Service Commission for the First District of New York, the traffic on the lines of the Interborough Rapid Transit Company on March 24 and March 25 were the greatest in the history of that corporation. The date second named was the day of the parade and review of the Twenty-seventh Division, New York's own returning national guard units. There was also very heavy traffic on many of the Manhattan surface lines, particularly on the parade day. On March 24, which was the day of another important military parade and review in the Borough of Brooklyn, the subway carried 1,824,735 passengers, and the Interborough elevated lines 1,332,607 passengers; while on the following day the subway carried 1,753,772 passengers, and the elevated lines 1,122,394 passengers. On both days, according to reports furnished to the commission, the Brooklyn Rapid Transit Company carried an extremely large number of passengers, on March 24 the traffic records being broken for several of its lines.



## Houston Must Have Increase At the End of Its Financial Rope, Company Appeals to District Court for Relief

The Houston (Tex.) Electric Company on March 28 filed a suit in United States District Court in Houston asking the court to grant a temporary injunction restraining the city of Houston from enforcing the present 5-cent fare ordinance on the ground that the fixing of the fare at 5 cents is resulting in the confiscation of the company's property.

### THE END REACHED

"The end has been reached and we might as well realize it and face the facts," said Luke Bradley, district manager for Stone & Webster, in discussing the situation. Mr. Bradley said that patrons who now ride on a 5-cent fare are getting the ride at less than cost, and this cannot continue.

The petition filed by the attorneys for the company refers to a 7-cent fare as one that would allow the company to pay operating expenses, care for depreciation and realize a return on the investment. The suit just filed is, however, for the primary purpose of having the 5-cent fare declared confiscatory. In order for the court to do that a valuation of the railway would have to be made, and officials of the company assert that is what they desire. Some time since the company sought to have the city go into the valuation of its property, but when the people by referendum vote turned down the 6-cent fare, the city dropped the matter.

The suit just filed before Federal Judge J. C. Hutcheson, Jr., is of an entirely different nature from that filed several months ago before Judge H. J. Dannenbaum in the District Court. That suit merely challenged the right of the people, by a popular vote, to fix the rate for a public utility, and contended that this power was vested only in the City Commission.

In the suit filed in federal court the company goes directly to the issue it raises and contends that the refusal of the city to allow the company to charge more than a 5-cent fare is confiscating the property of the company.

### CASE IN REVIEW

The petition reviews the steps the company has taken before the City Council to obtain a higher fare. It declares that the Mayor and the City Commissioners granted some relief once by passing a 6-cent fare ordinance, and tells how that ordinance was knocked out by a referendum election.

Mr. Bradley made the following statement of the company's position:

Conditions over which we have had no manner of control have forced us to go into the United States Court in order to protect the company from being rapidly destroyed through the refusal of the city of Houston to permit it to earn sufficient revenues to maintain itself.

In June of last year, having foreseen the fact that we could not continue to operate the system, keep up the property and meet the growing needs of Houston without an increase in fare, we went before the City Council and sought relief which we knew

to be absolutely necessary to the very existence of the company.

We went fully into the condition which confronted us, showed conclusively that costs of operation had progressed to the point where relief was essential if we would escape disaster, ruinous alike to those who had invested in the property, as well as to the property itself, and asked the privilege of putting into effect in Houston a 6-cent fare.

While this application was pending and under discussion, it became necessary to increase wages due to high cost of living and general war conditions, which by the way, still obtain, to the amount of \$160,000 per annum.

The relief granted by the city was turned down by the referendum, which was held, wherein about one-fourth of the voters participated.

Since that time the condition of the company has grown steadily worse instead of better. A summary of its operations for the five months ended Feb. 28, 1919, will make this clear to anyone who will study these figures, which are taken from the bill we have filed in the United States Court.

Gross earnings .....	\$693,423
Operating expenses .....	547,502
Balance .....	\$145,921
Taxes .....	47,624

Balance .....

Balance .....

The bill also sets out that the company should have had depreciation during that time, \$83,333; for supplementary maintenance, \$30,000; for return on the investment, \$166,666, or a total of \$280,000, leaving a deficit for five months' operation of \$181,703.

What does this mean and what is the answer? It means that there can be no development of railway transportation in Houston until some satisfactory understanding of the present problems is reached with the public.

### Decision Again Diverting Traffic

Removal of tracks from Main Street, between Ervay and Austin Streets, in Dallas, Tex., is again being considered. Richard Meriwether, general manager of the Dallas Railway, said that the removal was a matter for the merchants on Main Street to decide. He said that the company was not averse to the removal of the tracks from Main Street, and the diversion of the traffic to Elm and Commerce, which parallel Main Street one block distant on either side, if the removal could be effected without offense to any of the merchants on Main Street. The company is now laying new railways on Main Street and Mr. Meriwether asked that a decision in the matter be reached at once, before the new rails were put down.

The merchants on Main Street seem to be equally divided on the removal plan. In connection with this matter it has been recalled that the proposal was laid before John A. Beeler, New York, traffic engineer, at the time Mr. Beeler made a survey of the railway properties in Dallas. Mr. Beeler then opposed the removal. It could be effected now, however, without causing inconvenience, and according to Mr. Beeler it might prove of advantage. Dallas will, however, grow too much in the near future for the plan to be feasible, Mr. Beeler told the city in his report. In time, it would become absolutely essential that cars be operated on this thoroughfare to care for the traffic originating in the down-town section of the city.

In view of this opposition and Mr. Beeler's report, it is not likely that the tracks will be removed, and with this belief, the railway is going ahead with the work of laying heavy steel.

### Zone Charge Modified by Shore Line

On April 1 the Shore Line Electric Railway, Norwich, Conn., changed its old 3-cent zone to a 2½-cent zone. The system of fares in force heretofore has covered a 5-cent minimum fare in two zones, this charge making a 5-cent fare within the cities of New London and Norwich, with free transfer at the center of the city, and the interurban lines divided in short zones of 3 cents each. The company has reduced the interurban rate to 2½ cents a zone, so that for a ride wholly within the city the rate is 5 cents and for a ride wholly within the city and one zone outside 7½ cents; two zones outside, 10 cents; three zones outside, 12½ cents, and for two zones on any of the interurban lines, 5 cents; three zones, 7½ cents, with a minimum charge of 5 cents for a ride in one or two zones.

Briefly, the only effect of the modification is a slight reduction in the interurban rate which in some instances was higher than the steam roads that parallel the electric railway, although the rate per mile on the electric railway was about 2.8 cents. The company is collecting everything up to 10 cents with the Rooke register, the 2½ cents being paid by use of a token collected through the register. The use of the token is not permitted for any other purpose than the payment of the odd change. In other words, the company does not allow the use of two 2½ cent tokens for a 5-cent fare.

### Six Cents Being Charged in New Jersey

A 6-cent fare on the lines of the Public Service Railway in New Jersey went into effect on April 1. This is a reduction of 1 cent from the fare which patrons have been paying since an order of the Board of Public Utility Commissioners last fall, but in addition passengers have to pay 1 cent for initial transfers.

During the week ended March 29 the company applied to the commission for permission to continue the 7-cent fare pending a decision of the zoning system which the company hopes to establish next July. Representatives of the municipalities affected opposed the application, and the commission ordered the 6-cent fare in effect on April 1, in accordance with the original ruling, pending a hearing on the matter. This hearing will be held on April 7.

A hearing will also be held on the zoning system, which would give the company the right to charge 5 cents for the first zone and additional charges for other zones. This hearing will be held on April 14. The plans for the zone system have been reviewed at length in the ELECTRIC RAILWAY JOURNAL.



## Transportation News Notes

**Toronto Issues Weekly Bulletin.**—In order to present the facts of its case before its patrons, the Toronto (Ont.) Railway recently began to distribute in its cars, a weekly bulletin called *Public Service Topics*.

**I. C. C. Approves Seven-Cent Fares.**—The Interstate Commerce Commission has granted the applications of the Louisville & Southern Indiana Traction Company and the Louisville & Northern Railway & Lighting Company for permission to file schedules increasing the fares for the transportation of passengers between Louisville, Ky., and Jeffersonville, Ind., and New Albany, Ind., respectively, to the extent that the fares therein established do not exceed 7 cents.

**Skip-Stop System Modified.**—The Northern Texas Traction Company, Fort Worth, Tex., has modified the skip-stop system as employed on its lines. This action was taken after a committee had been appointed by the Chamber of Commerce to investigate the system and make recommendation for improving service. Under the modified plan, cars will stop at all churches and schools, and additional stops will be made on unpaved streets. The skip-stop plan will be continued on paved streets.

**Rainier Valley Line Wants More.**—The Seattle & Rainier Valley Railway, Seattle, Wash., has filed a new tariff with the Public Service Commission at Olympia, asking for an increase of fares to 6 cents. The company contends that it costs 40 per cent more to operate than the company is receiving for service. A charge of 1 cent is proposed in the tariff for all transfers from the company lines to city lines, and 2 cents for transfers accepted from the municipal lines. Policemen and firemen will not be allowed to ride free.

**Wants Ten Cents Now in Yakima.**—N. C. Richards, president of the Yakima Valley Transportation Company, North Yakima, Wash., announced on March 23 that he would file a new schedule of rates for city passenger fares—10 cents for cash fares, 8 cents for tickets and 4 cents for school children. Mr. Richards previously filed a schedule asking for an 8-cent fare on the city passenger system. This was noted in the *ELECTRIC RAILWAY JOURNAL* for March 22. E. D. Ridley, accountant for the Public Service Commission holds this rate is not high enough to make operating costs. North Yakima has a population of about 15,000.

**Would Discontinue Transfers.**—Following notification by the Warren & Jamestown Street Railway, Jamestown, N. Y., that on April 15 it will stop

transfer privileges with the Jamestown Street Railway, Mayor Samuel A. Carlson of Jamestown on March 28 asked the Public Service Commission, Second District, to issue an order directing the two roads to continue transfer privileges to patrons. It is claimed termination of transfers will be a source of continuing vexation and expense to residents. The commission will serve the complaint upon the railroads for answer. A hearing by the commission will follow.

**A Christening in Dallas.**—*Trolleygrams* is the name selected for the little folder to be "published every now and then" by the Dallas (Tex.) Railway's Service Department in charge of Dan Fisher. This is part of the company's campaign to create a feeling of good fellowship for the company and eliminate complaints against the service. The name *Trolleygrams* was selected after a contest in which a first prize of \$15, a second of \$5, a third of \$3 and a fourth of \$2 were offered for the best names submitted. The committee reported that it received more than 1,500 letters in which more than 5,000 names were submitted.

**May Boost Westerville Fares.**—The Columbus Railway, Power & Light Company, Columbus, Ohio, is considering the necessity of increasing fares on the Westerville Division. Under the franchise by which this line operates the company has had the right to increase the Westerville line rates since Feb 1, when the working capital had been reduced to \$14,507. By March 1 the capital was reduced to \$12,454. The franchise provides for an increase of one-third of a cent a zone, which adds 3 cents to the round trip, when the working capital is reduced to \$15,000. The terms of the franchise have been reviewed previously in the *ELECTRIC RAILWAY JOURNAL*.

**Traffic Survey for Minneapolis.**—John A. Beeler, New York, N. Y., has been engaged to make a preliminary traffic survey at Minneapolis, Minn., with the understanding that expenses up to \$2,500 will be paid by the Minneapolis Street Railway. The Council has abolished skip stops on all blocks of the city more than 400 ft. long. This rule affects a large part of the residence district and parts of the central system outside the loop district where stops are made every block. The Council has ordered 101 more street trips daily for the North Side to improve service, based on a survey by the city inspector and Council Committee on the traffic needs. This will restore service to pre-war conditions.

**Curbing the Auto in Kansas City.**—The police of Kansas City, Mo., have issued an order forbidding motor car parking on the three chief business streets downtown between the hours of 8 a.m. and 6 p.m., but the order has been suspended until its legality may be ascertained. The order is of interest to the railway as, with lines of parked cars along the business streets, there was not sufficient room between the cars

so parked and the railway tracks for the regular traffic. In preparing the order the police had in mind more particularly the menace in case of fire. By an ordinance passed on March 21 no jitney is allowed to remain stationary on any of the business streets and may stop to discharge or take on passengers only at such corners as the police may designate. Jitney fares have also been regulated—10 cents for the first twenty blocks and 5 cents for each additional twenty blocks.

**Six Cents in Gadsden.**—The Alabama City, Gadsden & Attalla Railway, Gadsden, Ala., has been granted a 6-cent fare on all its lines by the Public Service Commission of Alabama in its decision on the petition of the company for increased rates. At the same time, the company is requested to issue universal transfers on all of its lines without additional charge. Books of fifty tickets for \$2.50 must be offered for sale, usable only by the purchaser. The company failed to receive the full increase asked and the city gained a point when the commission ordered the universal transfer system placed in operation in this city. The company had asked for a 15-cent rate to Attalla, but had not asked any increase on its other lines. The city had asked that the company place the universal transfer system in effect. The change in fares was scheduled to go into effect on April 1.

**Conference on Interurban Fares in City.**—At a conference of the Board of Public Works of Indianapolis, Ind., representatives of the Interstate Public Service Company, the Indianapolis Traction & Terminal Company and citizens living in the Shelby Street district between Southern Avenue and Martin Street, the proposal was made that if the Interstate Company would charge a 10-cent fare within the city limits an arrangement might be made between it and the local company whereby the latter would use the traction company's tracks between Southern Avenue and Martin Street. The proposal raises the question whether the Interstate Company can be relieved of its franchise obligation to charge only 5 cents within the city limits and whether or not the granting of this privilege to one company would not open the way for all companies to charge 10 cents within the city limits. The Public Utilities Commission will have to pass on the matter finally. The Interstate Public Service Company recently filed a petition with the commission asking for a 10-cent fare in Indianapolis.

**Bus Competition Permitted.**—The Railroad Commission of California has authorized the De Luxe Transportation Company to establish an auto passenger service between Oakland and Hayward in connection with its present service between Hayward and San Jose. The commission forbids, however, the carrying of passengers locally between Hayward and Oakland, or intermediate points, the authorization being confined to the transportation of passengers between Oakland and points between Hay-



ward and San Jose. The San Francisco-Oakland Terminal Railways and the Peerless Auto Stage Association protested against the granting of the application. The railway has increased its service between Oakland and Hayward, and testified it could not continue the new service should the local traffic between Oakland and Hayward be divided and some carried by other methods of transportation. The railroad company did not object, however, to the certificate provided no local passengers were carried between Hayward, San Leandro and Oakland.

**Seven-Cent Zones for New Jersey Lines.**—The Board of Public Utility Commissioners of New Jersey has made an order granting the application of the Millville Traction Company to increase the fare in each of the zones from 5 cents to 7 cents and to withdraw from sale commutation tickets, excepting those sold to school children. The company operates in Millville, Landis Township and the Borough of Vineyard. There are only two fare zones in its territory. The commission found that the company during the past three years has not been able to earn its operating expenses, taxes and bond interest and may go into the hands of a receiver. In its report the commission said: "It is calculated that if the same number of passengers continues to ride under the 7-cent fare, the increased revenue to the company would be approximately \$24,400, but experience has demonstrated a large falling off in travel. Should the company lose 10 per cent of its passengers—and this is not unlikely—the actual increase in revenue would be about \$12,000 and the most favorable returns to the company from the increase, it is anticipated, will not provide sufficient revenue to pay the operating expenses, taxes and interest on the company's bonds."

**Fare Modification Ordered.**—The Public Service Commission for the Second District of New York has directed the Elmira Water, Light & Railroad Company, Elmira, N. Y., to amend its passenger tariff now in force by substituting Center Mills for the present designation, Elmira Heights, between Fourteenth and Lake Streets, and to change the zone designation to read Zone B on the Horseheads line, including all points intermediate between McCann's Boulevard and Center Mills. The order followed the investigation of a complaint by Commissioner Fennell that under the present tariffs the fare charged between Elmira and Center Mills, a point intermediate between Fourteenth and Lake Streets and Horseheads, was 11 cents, an increase of 6 cents over the fare charged prior to Oct. 1, 1918. The company formerly operated between Elmira and Horseheads with a two-zone fare in force and charged a 5-cent fare in each zone. The tariff which went into effect on Oct. 1, 1918, increased the fare to passengers between Center Mills and Elmira in excess of the increase to other passengers. The commission held that the 11-cent fare between Center Mills and Elmira was unjust.

## Personal Mention

### Raymond H. Smith Elected

Vice-President of Eastern Wisconsin Electric Company Becomes President of Wisconsin Electrical Association

Raymond H. Smith, vice-president and general manager of the Eastern Wisconsin Electric Company, with headquarters at Sheboygan, Wis., has been elected president of the Wisconsin Electrical Association and the Wisconsin Gas Association.

Mr. Smith entered the utility field with the Waterbury (Conn.) Traction Company, in 1897, and held various positions in the electric and the railway departments of the Connecticut Railway & Lighting Company until 1900, at which time he became assistant superintendent of railways. In 1900 he was transferred to the headquarters of the Connecticut Railway & Lighting



R. H. SMITH

Company at Bridgeport, Conn., as purchasing agent and secretary to the general manager. In 1903 Mr. Smith was made superintendent of the company at Bridgeport and held this position until 1907 at which time he became general manager of the Albany & Hudson Railroad, Albany, N. Y. This company, two years later, passed through a receivership, and Mr. Smith was made receiver, and later was made general manager of the reorganized company, the Albany Southern Railway.

In 1912 Mr. Smith left Albany and became general manager of the Jackson Light & Traction Company, Jackson, Miss., which position he held until 1916. In November of that year he was made vice-president and general manager of the Sheboygan (Wis.) Electric Company. Mr. Smith was the first president of the Rotary Club at Jackson, Miss., and at the time of leaving that city was vice-president of the Board of Trade and also of the Country Club.

In March, 1918, the Sheboygan Electric Company was consolidated with the Wisconsin Electric Railway, Oshkosh, Wis., and the Eastern Wisconsin Railway & Light Company of Fond du Lac, Wis., and Mr. Smith was made vice-president and general manager of the consolidated company, the Eastern Wisconsin Electric Company.

### Walter Jackson Returns from Great Britain

After four months' absence, Walter Jackson of the ELECTRIC RAILWAY JOURNAL has returned from the United Kingdom, which he visited to secure first-hand data on the zone or graduated fare. His first studies, covering the famous system of Glasgow, appeared in the issues of Feb. 22, March 8 and March 29, but the amount of information acquired is so extensive that it will be a matter of months before the series is concluded. The articles cover the widest possible range of conditions, bringing out, among other facts, that the zone fare is not only used on cars of large capacity, operated on very short headways, but that it offers many opportunities for developing traffic to an extent undreamed of with a universal fare. The managers of both the private and municipal undertakings showed Mr. Jackson every possible courtesy, making it plain that they were only too glad to assist their American cousins with any experience at their command. They indicated by their comments and questions that they were well informed concerning operating practices and tendencies of the electric railways in the United States and Canada.

In addition to the studies of the graduated fare, Mr. Jackson also went into other topics such as the development of parcels and freight handling and the use of car-checking instruments. In the latter, particularly, British operators have been very progressive as a class, the proportion of properties using power-saving devices being much greater than in the United States.

### Changes in Personnel at Seattle

With the single exception of D. W. Henderson, superintendent of transportation of the Puget Sound Traction, Light & Power Company, Seattle, Wash., it is not expected that any of the old organization chiefs or heads of department will remain now that the city of Seattle has assumed jurisdiction over the railway lines under the purchase agreement. A. L. Kempster, manager, remains with Stone & Webster at Seattle; G. A. Richardson, superintendent of the railway department, will become connected with the Phil-



Philadelphia Rapid Transit Company; A. D. Campbell, superintendent of rolling stock and shops, has been loaned by Stone & Webster to report on shop practice and shop facilities of the Brooklyn Rapid Transit Company; E. D. Merrill, traffic manager, has become connected with the Milwaukee Electric Railway & Light Company at Milwaukee; E. J. McIlraith, superintendent of way and structures, is making a report on the Chicago Surface Lines; F. M. Hamilton, superintendent of the "accident prevention department," will not remain with the properties under city management. Accident claims will hereafter be handled by the city attorney's office, engineering by the city engineer's office, paving by the department of streets, etc.

### New Electrification Official

W. C. Ennis, formerly superintendent of the Musselshell Division of the Chicago, Milwaukee & St. Paul Railway, has been appointed assistant superintendent of the Coast Division, the Tacoma Eastern and the main line west of Othello. Mr. Ennis will work in conjunction with the electrical forces of the system, and will make an effort to hasten the electrification of the line from Othello to Seattle, so that it may be completed during the summer. The work of completing the substations is well under way; poles are set and wires are being strung. It is stated that the only obstacle to the operation of the line early in the fall will be a possible delay in delivery of the electric locomotives. Orders for the locomotives were placed some time ago.

G. A. Richardson will shortly assume the office of superintendent of transportation for the Philadelphia (Pa.) Rapid Transit Company and thus fill the vacancy made by the elevation of H. G. Tulley, who was some months ago made vice-president in charge of welfare and public relations.

Capt. F. D. Burpee, who has not been actively connected with the Ottawa (Ont.) Electric Railway for the past three years, has returned from France and has resumed his former position of superintendent. During his absence he has been engaged in the construction of narrow and standard gage railways in France with the fifth Battalion, Canadian Railway Troops.

Charles H. Smith, assistant general manager in charge of the Troy division of the United Traction Company, Albany, N. Y., has been granted an indefinite leave of absence on account of ill health. Mr. Smith has been in the employ of the company since he was a boy. He began work for the Troy and Lansingburg line in the Lansingburg carhouse, filling and cleaning the oil lamps that were used in the horse-car days for illumination. In the course of years he received promotions, and at the time of the formation of the Uni-

ted Traction Company on Jan. 1, 1900, was placed in charge of the Troy division.

George A. Murch, who for three years has been manager of the Public Electric Light Company and superintendent of the St. Albans & Swanton Traction Company, St. Albans, Vt., has resigned. He has made no definite statement as to his future plans. Previous to his connection with the companies at St. Albans Mr. Murch was manager of the Maynard & South Acton Railway, at South Acton, Mass. He has supervised the building of many railway systems, among them roads at Toledo, Waterville, North Attleboro, Worcester and Bangor.

W. J. Henderson, chief of the division of capitalization of the Public Service Commission for the Second District of New York, which division has had charge of all accounting and financial investigations for the up-state Public Service Commission since its inception, has severed his connection with the commission to become associated with the organization of H. C. Hopson, New York, N. Y., which is specializing on matters relating to rates, capitalization, taxes, etc. Mr. Henderson, prior to his connection with the Public Service Commission, was for many years in the accounting and latterly the statistical department of the New York Central & Hudson River Railroad.

D. J. McGrath, formerly special assistant to President M. C. Brush of the Boston (Mass.) Elevated Railway, has resigned his commission as first lieutenant in the Sanitary Corps, U. S. Reserves, and has become assistant to the president of the Mobile Light & Railroad Company. Prior to his connection with the Boston Elevated Railway Mr. McGrath was research assistant in the electrical engineering department of the Massachusetts Institute of Technology and was joint author with Prof. D. C. Jackson of that institution of a book summing up the fare investigations made by that department. Mr. McGrath has also contributed a number of articles to this paper on transportation matters.

Ernest A. Murphy, superintendent of equipment of the United Traction Company, Albany, N. Y., at North Albany, has taken over the duties relinquished by Charles H. Smith, who as noted elsewhere in this department has been serving as assistant general manager in charge of the Troy division. Mr. Murphy went to Albany two years ago from the Interborough Rapid Transit Company, New York. He has had charge of the company's car shops in the northern section of the city. Under Mr. Murphy's direction the company last year started to build a number of new cars of large type. About eight of these cars are now running between Albany and Troy, and others to run between Albany and Cohoes will be put on in April. Mr. Murphy has also introduced many improvements in shop methods.

## Obituary

Emil C. Braun, for fifteen years connected with H. M. Byllesby & Company, Chicago, Ill., as an electrical engineer and valuation expert, died suddenly on March 23, as the result of a fall which caused a hemorrhage. Mr. Braun was born in Germany in 1868 and came to this country in 1893 in charge of the German electrical exhibit at the World's Columbian Exposition, Chicago. He was educated at the Universities of Frankfurt and Berlin.

August Belmont, Jr., son of Major August Belmont, the banker, who was a member of his father's firm and connected with other important enterprises, died on March 29, following an operation for intestinal trouble. He began his business career as a clerk in the banking firm of his father, and on Jan. 1, 1910, was admitted as a member of the firm. Other enterprises with which he was identified at the time of his death were the Degnon Realty & Terminal Improvement Company, Degnon Terminal Railroad Corporation and Interborough Consolidated Corporation.

Major James Alfred Roosevelt, who had been in command of the 302d Ammunition Train of the Seventy-seventh Division in France, died on March 26 on the naval transport Great Northern while the vessel was 400 miles east of Sandy Hook. Major Roosevelt was a member of the advance guard of the Seventy-seventh Division, returning to make arrangements for the reception of the division, which is expected to arrive in New York during the first week in May. He was born in New York in 1885 and was graduated from Harvard University in the class of 1905. He was connected with Stone & Webster, Boston, Mass., for two years and for four years prior to 1911 was with the Third Avenue Railroad, New York, N. Y., first as assistant to the general manager and then as general superintendent. He next became superintendent of transportation of the British Columbia Electric Railway, Vancouver, B. C. Subsequently he became a member of the engineering firm of Roosevelt & Thompson, specializing in railway engineering work. Major Roosevelt attended the first Plattsburg Training Camp in the summer of 1917, and on completing the course he was commissioned a captain of infantry. He was assigned to the 308th Infantry, then being formed at Camp Upton, Long Island, and went overseas with that regiment last April. After taking part in a number of engagements with the Seventy-seventh Division he was promoted to major and given command of the divisional ammunition train. Major Roosevelt had been cited for displaying exceptional bravery and courage under heavy fire, while the Seventy-seventh Division was fighting for the possession of the Vesle River.



# Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER,

SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES

BUSINESS ANNOUNCEMENTS

## Great Britain to Resume Traction Work

**Delay Due to Lack of Men and Raw Materials—Linking Together of Lines Sought**

In England the revival of business for manufacturers of railway supplies grows almost from day to day. Moreover, a number of the more important municipalities are arranging to raise large loans for extensive developments. Immediate expansion on a very large scale is somewhat delayed by the manufacturers requiring time to get their men back from military work, to get raw materials and to reconvert their works from military to civilian uses. The full demands of some of the railway authorities also cannot come into active operation until they get legislative sanction for their schemes and authority to raise the additional capital. There is, however, a good deal of work free from any factor of delay, of the kind which only awaits the manufacturer undertaking it.

New cars and omnibuses are wanted by many municipalities and fresh invi-

England an arrangement of the kind is now in operation.

The new call for additional rolling stock was in the first place for omnibuses, the reason being that much earlier delivery of these could be promised than in the case of cars. That stage appears already to be over, and tenders for cars are now being freely invited. It is no new development for traction companies to seek omnibuses in order to supplement their railway services, but it is more prominent at present because of the urgent necessity for additional means of transportation.

There are great arrears to make up both in cars and track work. Prices must, for some time at least, continue high, but renewals, additions and extensions are urgent. Hundreds of miles of new rails will have to be laid down it is said, no matter what the cost, as soon as plenty of labor is available. What traction companies require is a continuance of heavy traffic and of increased fares, together with some more or less permanent settlement of the labor trouble which has for some time been so menacing.

In regard to rails, during the war

## Further Price Reductions in Steel Equipment

**Transformers, Turbines, Brakeshoes and Track Hardware Affected—Track Equipment Not Yet Released**

Following the cut in steel prices expected by the steel producers, there have been further reductions applied by manufacturers to commodities entering into electric railway equipment. These reductions, although not radical in any respect, are capable of giving some incentive to buying in a field which previous to the time of the reduction had been devoted more to maintenance than new construction.

In the issue for last week of the *ELECTRIC RAILWAY JOURNAL* were given a number of items of electric railway materials which had just been subjected to price reductions. These readjustments comprised general prices on rails, steel and iron bars, certain steel sheets used, among other things, for tubular poles for railway and lighting work, tubing, rigid and flexible metallic conduit, sheets, wire products and pole line hardware.

Recent inquiries have resulted in locating further lines of material which have been affected by the general reduction of steel prices. Outlet boxes, covers, brushings and nuts have decreased 20 per cent, while stamped steel boxes are easier by approximately 18 per cent. This latter item, however, went into effect before the steel prices were accepted and merely shows one instance of the downward trend before assistance by the Industrial Board.

## TRANSFORMERS SHOW REDUCTION

Transformers of 200-kva. capacity and above were subjected to a reduction of 10 to 15 per cent in price about the middle of February, and in the distribution type up to 200-kva. capacity, there has just been a reduction of 10 per cent. Steam turbines for both electric generation and mechanical drive have also decreased in price to the extent of 5 per cent.

The reduction in price of brakeshoes is 10 to 12 per cent. This takes into account the different qualities of shoes for the various classes of service. Bolts, nuts and rivets have suffered a cut of from 20 per cent to 40 per cent from war prices. Reductions have also taken place in other railway materials, but to date manufacturers have not made available the new prices. As soon as the schedules are made up further information will be given on such materials as car wheels and axles, brake beams, trucks, etc.

Material	Prices, 1914	Price Dec., 1918	Percentage
Rails	£6 per ton	£17 10/ per mile	197
Setts, Whin	18/ per ton	26/ per ton	44
Setts, Granite	25/6 per ton	42/6 per ton	67
Cement	34/ per ton	129/ per ton	279
Trolley wire, phosphor bronze	£102 4/ per mile	£189 per mile	85
Strand wire	16/6 per cwt.	49/ per cwt.	200
Gear wheels	£3 2/ each	£13 18/ each	348
Pinions	10/ each	£2 15/6 each	450
Tires	28/ each	£4 8/6 each	216
Armature coils	£5 per set	£17 5/ per set	245
Lamps	5d. each	1/3 each	200
Trolley heads	26/3 each	56/3 each	114
Trolley wheels	3/2 each	4/3 each	34
Oils	1/ per gallon	3/ per gallon	200
Tickets	3d. per 1000	1/3 per 1000	400
Timber			500

tations to tender are steadily being issued. A new development is promised by the London County Council. They propose immediately to apply for Parliamentary authority to own and work motor omnibuses for the purpose of linking up electric railway dead ends and for suburban prolongation of railway routes. In this way they hope partially at least to meet requirements until their traction system can be extended. Many municipal traction authorities in England have powers to work omnibus services, and there is no reason why London also should not have them. London also proposes to ask authority to construct a number of short electric lines as extensions and to link together existing lines, at a cost of over \$2,000,000. A proposal that the County Council should offer to contribute  $\frac{1}{2}$  of a cent per omnibus mile to the road authorities for road maintenance raises an important question of principle, and is still undecided. In a few places in

when none could be obtained in England, Middlesex County Council ordered a small quantity from the United States which, including freight and insurance, cost £30 a ton, compared with £7 10s. before the war. The maximum price in England is now £17 10s. a ton.

In connection with applications for higher zone rates in Great Britain, it may be interesting to note the above increases in electric railway materials from 1914 to December, 1918.

## Foreign Opportunity

A man in the Azores desires to secure an agency and possibly purchase all articles and supplies connected with the construction and installation of a hydroelectric plant of 3000 hp. and the construction and equipment of an electric railway system of approximately 50 miles. Correspondence may be in English. Communicate with No. 28784, Bureau of Foreign and Domestic Commerce, Washington, D. C.



## 1300 Power-Saving Recorders Ordered

Will Be Used in Baltimore, Md., in Campaign Which Is Soon to Be Inaugurated

The United Railways & Electric Company, Baltimore, Md., has ordered 1300 of the Arthur power-saving recorders. Delivery on these is to begin within thirty days and to be completed within two months. These recorders are of the single-dial type, applicable to either hand-brake or air-brake cars, there being no connection with the brakes. The amount of money involved in this order is between \$50,000 and \$60,000. The purchaser has not specified any unusual features in the instrument with the exception of a particular type of lead seal. The expected coal and power saving with the recorders is from 10 to 15 per cent at the start, and 20 to 25 per cent ultimately.

Mr. Arthur will act in a consulting and organizing capacity in the inauguration of the power-saving campaign. He will give a series of talks to the motormen, special talks to the chief motormen and other instructors, using large diagrams that have been developed for the purpose. Another member of the Arthur organization, formerly chief power-saving inspector on a large property, will probably be stationed at Baltimore for some time.

Before the United Railways decided to install power-saving recorders its engineers and transportation officials visited a number of properties for the purpose of studying the matter from all angles.

## Steel Prices Rejected by Director General Hines

Director General Hines, of the Railroad Administration, has refused definitely to agree to buy steel at the prices fixed recently at a conference of the Industrial Board and representatives of the steel industry. The price of steel rails offered particular concern. This somewhat disorganizes the plans of the Industrial Board for adherence by government departments to the price fixing agreements now being arranged for the great staples, such as coal and steel.

The Director General took the position that the agreements between the operators and the board amounted to actual price fixing. He cited the possible hazards of the Sherman law and insisted that the agreements would really constitute a violation of the statutes.

## Rolling Stock

Central Illinois Public Service Company, Mattoon, Ill., has contracted for ten new steel cars to be placed in city service in Charleston, Mattoon, Paris, Taylorville and Anna. The cars will be of the safety type for one-man operation. Delivery is expected within ninety days.

Kansas City (Mo.) Railways has ordered twenty-five one-man cars for delivery early in April. They are furnished by the American Car Company of St. Louis, Mo., and the Cincinnati (Ohio) Car Company. The length of the cars will be 27 ft. 9½ in. Eleven

will be equipped with two Westinghouse No. 506—AH—2 motors and fourteen cars with two General Electric No. 258 motors. All cars will have K-10 control. Fifteen are to have Westinghouse air compressors, and ten will have General Electric air compressors, all using Safety Car Devices Company's equipment. The seating capacity will be thirty-five passengers and the cars will weigh approximately 14,000 lb.

## Track and Roadway

Birmingham Railway, Light & Power Company, Birmingham, Ala.—An order for 1,500 tons of steel rails has been placed by the Birmingham Railway, Light & Power Company with the Tennessee Coal, Iron & Railway Company. The first lot of 1000 tons of rails has been ordered for immediate delivery and the remaining 500 tons is to be delivered in sixty days. The rails are ordered for the purpose of retracking 13 miles of the company's lines in Birmingham. The new rails are of a heavier type than those at present in use. The work will be started at once. The retracking work will include portions of the Twentieth Street and Avenue B Loop line, the Gate City, North Ensley, Avondale, and some of the crosstown lines.

Mobile, Ala.—The organization of the Baldwin County branch of the Gulf Coast Municipal Interurban League was recently perfected at a mass meeting held at Foley, Ala., the purpose being to have the proposed municipally-

## NEW YORK METAL MARKET PRICES

	Mar. 13	Apr. 3
Copper, ingots, cents per lb.	14.75	15.50
Copper wire base, cents per lb.	17.25 to 18.00	17.25 to 18.00
Lead, cents per lb.	5.25	5.25
Nickel, cents per lb.	40	40.00
Spelter, cents per lb.	6.50	6.62½
Tin, cents per lb.	72.50	72.50
Aluminum, 98 to 99 per cent., cents per lb.	30.00	30.00

† Government price in 25-ton lots or more f.o.b. plant.

## OLD METAL PRICES—NEW YORK

	Mar. 13	Apr. 3
Heavy copper, cents per lb.	12.75 to 13.25	13.00 to 13.25
Light copper, cents per lb.	10.75 to 11.00	10.50 to 11.00
Heavy brass, cents per lb.	7.25 to 7.50	7.25 to 7.50
Zinc, cents per lb.	5.25 to 5.50	5.25 to 5.50
Yellow brass, cents per lb.	6.00 to 6.25	6.00 to 6.50
Lead, heavy, cents per lb.	4.75 to 4.87	4.25 to 4.50
Steel car axles, Chicago, per net ton	\$28.00 to \$30.00	\$26.00 to \$28.00
Old carwheels, Chicago, per gross ton	\$22.00 to \$23.00	\$22.00 to \$23.00
Steel rails (scrap), Chicago, per gross ton	\$16.50 to \$17.00	\$17.00 to \$17.50
Steel rails (relaying), Chicago, gross ton	\$15.50 to \$16.00	\$16.50 to \$17.00
Machine shop turnings, Chicago, net ton	\$5.50 to \$6.00	\$6.50 to \$7.00

## ELECTRIC RAILWAY MATERIAL PRICES

	Mar. 13	Apr. 3
Rubber-covered wire base, New York, cents per lb.	21	20
Weatherproof wire (100 lb. lots), cents per lb., New York	25.75 to 33.75	24.25
Weatherproof wire (100 lb. lots), cents per lb., Chicago	30.75 to 37.35	23.75 to 37.35
T rails (A. S. C. E. standard), per gross ton	\$60.00 to \$65.00	49.00 to 51.00
T rails (A. S. C. E. standard), 20 to 500 ton lots, per gross ton	\$57.00 to \$60.00	47.00 to 49.00
T rails (A. S. C. E. standard), 500 ton lots per gross ton	\$55.00 to \$60.00	45.00 to 47.00
T rail, high (Shanghai), cents per lb.	3½	?
Rails, girder (grooved), cents per lb.	4½	?
Wire nails, Pittsburgh, cents per lb.	3½	3.25
Railroad spikes, drive, Pittsburgh base, cents per lb.	3.65	3.25
Railroad spikes, screw, Pittsburgh base, cents per lb.	8	8
Tie plates (flat type), cents per lb.	3	2.75
Tie plates (brace type), cents per lb.	8	7
Tie rods, Pittsburgh base, cents per lb.	7	?
Fish plates, cents per lb.	3	3
Angle plates, cents per lb.	3	2.75
Angle bars, cents per lb.	3	3
Rail bolts and nuts, Pittsburgh base, cents per lb.	4.90	4.35
Steel bars, Pittsburgh, cents per lb.	2.70	2.35
Sheet iron, black (24 gage), Pittsburgh, cents per lb.	4.55	4.20
Sheet iron, galvanized (24 gage), Pittsburgh, cents per lb.	5.60	5.25
Galvanized barbed wire, Pittsburgh, cents per lb.	4.35	4.10

	Mar. 13	Apr. 3
Galvanized wire, ordinary, Pittsburgh, cents per lb.	3.95	3.70
Car window glass (single strength), first three brackets, A quality, New York, discount †	77%	80%
Car window glass (single strength), first three brackets, B quality, New York, discount	77%	80%
Car window glass (double strength, all sizes AA quality), New York discount	79%	81%
Waste wool (according to grade), cents per lb.	13 to 20	14 to 17
Waste cotton (100 lb. bale) cents per lb.	11 to 13	8 to 13½
Asphalt, hot (150 tons minimum) per ton delivered	.....	.....
Asphalt, cold (150 tons minimum, pkgs. weighed in, F. O. B. plant, Maurer, N. J.), per ton	.....	.....
Asphalt filler, per ton	\$30.00	.....
Cement (carload lots), New York, per bbl.	\$3.20	\$2.90
Cement (carload lots), Chicago, per bbl.	\$3.34	\$3.05
Cement (carload lots), Seattle, per bbl.	\$3.68	\$3.13
Linseed oil (raw, 5 bbl. lots), New York, per gal.	\$1.53	\$1.53
Linseed oil (boiled, 5 bbl. lots), New York, per gal.	\$1.60	\$1.60
White lead (100 lb. keg), New York, cents per lb.	13	13
Turpentine (bbl. lots), New York, cents per gal.	69½	75

† These prices are f. o. b. works, with boxing charges extra.



owned electric interurban railway from New Orleans to Mobile extended from Mobile through Baldwin County, Pensacola, Fla. The Legislatures of Louisiana and Mississippi having passed identical laws authorizing municipalities to own, construct and operate interurban railways, a duplicate of this law is now before the Alabama Legislature and a similar bill will be introduced in the Florida Legislature as soon as it convenes.

**Somers Electric Company, Hartford, Conn.**—The House at Hartford recently rejected the bill authorizing the Somers Electric Company to buy the property of the Hartford & Springfield Street Railway and conduct the railway in the towns of South Windsor, East Windsor, Windsor Locks, Enfield and Somers. The Hartford & Springfield Street Railway is now in the hands of a receiver.

**St. Petersburg-Tampa Railway, St. Petersburg, Fla.**—The entire right-of-way has been secured for the proposed line of the St. Petersburg-Tampa Railway between St. Petersburg and Tampa and it is expected that construction of the line will be begun shortly. George S. Gandy, Sr., St. Petersburg, president. [Apr. 13, '18.]

**St. Louis & East St. Louis Interurban Railway, East St. Louis, Ill.**—The St. Louis & East St. Louis Interurban Railway, a company formed by officials of the East St. Louis & Suburban Railway for the purpose of operating cars between St. Louis and East St. Louis via the free bridge, has been granted a dissolution and returned its charter to the Secretary of State. The charter allowed the company to operate cars into St. Louis if the consent of the officials of the city of St. Louis was obtained. This consent was never sought and all efforts to complete the work of operating cars over the free bridge was dropped soon after the charter was obtained.

**Mexico Tramways, Mexico City, Mex.**—It is announced that if the British syndicate which owns the Mexico Tramways system is successful in its efforts to obtain the return of that property from the Carranza government, extensive plans for extensions and improvements will be carried out.

**Trenton & Mercer County Traction Company, Trenton, N. J.**—The Trenton & Mercer County Traction Corporation has asked the City Commission of Trenton for permission to relocate its track on a number of streets in Trenton. The company wants to abandon a part of the line on Bridge Street and extend its line to the new municipal dock along the Delaware River, using 70-lb. T-rail.

**Jersey Central Traction Company, Keyport, N. J.**—A report from the Jersey Central Traction Company states that it will rebuild the trestle approaches to the county bridge.

**Dallas (Tex.) Railway.**—The City Commissioners of Dallas are expected to issue an order to compel the Dallas Railway to build an extension through

the Mount Auburn addition to the city. M. N. Baker, supervisor of public utilities, has directed a letter to the Dallas Standard Traction Company, which now operates a short line in Mount Auburn, asking authority to examine its books with a view to determining the receipts of the company as well as to place a valuation on the property. The residents of Mount Auburn have made repeated efforts to have the Dallas Railway take over the line. It is probable the Dallas Railway will be ordered to extend its Elm Street line through Mount Auburn.

### Power Houses, Shops and Buildings

**Miami Beach Electric Company, Miami, Fla.**—The Miami Beach Electric Company, which proposes to construct an electric railway at Miami Beach, also plans to erect an electric light system and ice plant.

**Ironwood & Bessemer Railway & Light Company, Ironwood, Mich.**—This company reports that during the next seven weeks it expects to place contracts for the construction of a new brick carhouse, 110 ft. x 50 ft., at Ironwood.

**Kansas City, Clay County & St. Joseph Railway, Kansas City, Mo.**—A new building for handling freight will be constructed by the Kansas City, Clay County & St. Joseph Railway at South St. Joseph, Mo. The company will also purchase a complete armature for a 1500-volt rotary converter.

**Jersey Central Traction Company, Keyport, N. J.**—A report from the Jersey Central Traction Company states that the Monmouth Lighting Company, which leases the former company's power plant, is constructing an addition to the station and will install a 502-hp. B. and W. Sterling boiler. The work will be completed May 1.

**Trenton & Mercer County Traction Company, Trenton, N. J.**—A new engine is being installed at the power house of the Trenton & Mercer County Traction Company on Lincoln Avenue.

**Northern States Power Company, Sioux Falls, S. D.**—Work, it is understood, will soon be started on the erection of a 60,000-volt electric transmission line to connect the Sioux Falls division of the Northern States Power Company with the company's transmission system in southwestern Minnesota, between Pipestone and Dell Rapids, a distance of 35 miles. A new 3500-kw. steam turbine will be installed at the Sioux Falls power house to take care of the increased loads, which will be secured over the new line.

**Chattanooga Railway & Light Company, Chattanooga, Tenn.**—The powerhouse of the Chattanooga Railway & Light Company, which supplied energy for the operation of the Lookout Mountain Railway, was recently destroyed by fire, together with considerable machinery, sheds and several cars.

### Trade Notes

**C. E. Hague**, formerly production engineer of the Mid-West Engine Company, Indianapolis, Ind., has been appointed sales manager of the American Steam Conveyor Corporation, Chicago, Ill., manufacturers of American Steam Ash Conveyor and other ash-handling equipment.

**Chicago Pneumatic Tool Company, Chicago, Ill.**, announces the discontinuance of its office at Wichita, Kan., and the transfer of stock to Eldorado, Kan., where an office and warehouse have been established. The company also announces the opening of a new office and warehouse at Tulsa, Okla.

**H. G. Lewis**, sales manager of the Electric Service Supplies Company, Philadelphia, Pa., has recently been made vice-president. Mr. Lewis has acted in this former capacity for many years and is well known in the electric railway, mining and power fields. He will continue his work as sales manager of the company.

**C. B. Finnell**, formerly traveling secretary to the general superintendent of the C., B. & Q. Railroad, and later private secretary to the president of the Commonwealth Steel Company, has just been appointed private secretary to Walter A. Zelnicker, president of the Walter A. Zelnicker Supply Company. Mr. Finnell is president of the Junior Chamber of Commerce of St. Louis, an organization of 1000 members of the younger business men of that city.

**Arthur F. Braid** has been appointed sales manager of the metal and alloy department of the Metal & Thermit Corporation. Mr. Braid came to the company seven years ago as a traveling salesman, but after a few years of most successful service in this capacity he was appointed assistant superintendent of the Jersey City plant, in charge of the manufacture of carbon-free metals and alloys. When the United States entered the war he assumed active charge of the metal sales at the company's New York office.

### New Advertising Literature

**Ohmer Fare Register Company, Dayton, Ohio:** Circular containing pictures showing typical interiors at the manufacturing plant.

**Locomotive Superheater Company, New York, N. Y.:** Bulletin No. T1 on superheaters for stationary power plants; showing construction of superheater and methods of application to typical burden.

**General Railway Signal Company, Rochester, N. Y.:** Bulletin 185 on absolute permissive block system circuits. Sixteen pages. The text matter and diagrams of a paper presented at the regional meeting of the Railway Signal Association of Galveston, Tex., on July 27, 1918, by one of the representatives of the company.



# Peacock Brakes from Coast to Coast



## Making Safety Cars Safer in Seattle

When you realize that Seattle, Washington, serving a population of 400,000, increased travel by one-half, while simultaneously reducing operating costs by one-third, you begin to realize the importance of **good brakes** on Seattle's Safety Cars. Scores of those *Brakes* are **Peacocks**.

And they helped *cut operating costs* in spite of the steep **grades** for which Seattle and other Pacific coast cities using these brakes are famous.

Peacock Brakes insure business-building, cost-cutting service in big and small cities, under all conditions. Need we say more?

*Next Stop*—CALGARY

**National Brake Co.**  
Buffalo, N. Y.



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Industrial Plants and Buildings, Steam Power Stations, Water  
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## The Coal & Iron National Bank of the City of New York

Capital, Surplus &amp; Profits \$1,635,000

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Offers to dealers every facility of a New York  
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## THE J. G. WHITE COMPANIES

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## SAFE SIGNALS for SAFE ROADS

No road is safe if its signal system is uncertain, unaggressive or unsubstantial.

U. S. Electric Signals are big, aggressive notices of safety or danger. A blind man could hardly disregard them. Strongly made and weather immune. Protect both front and rear of cars. Type G, illustrated here, is a simple, safe and effective signal at a low price. More than a thousand sets in daily use.

Don't wait for the accident! Write for particulars today.



United States Electric Signal Company  
West Newton, Massachusetts

Representatives  
Western: Frank F. Bodler, Monadnock Bldg., San Francisco

Foreign: Forest City Electric Service Supply Company, Salford, Eng.



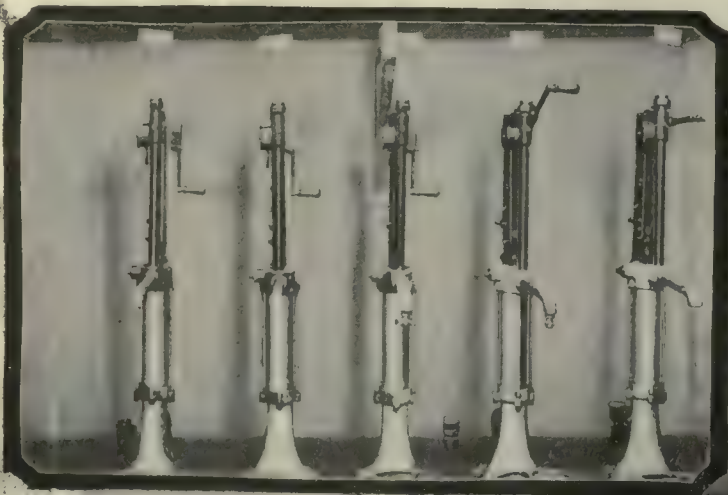


# *This up-to-date G&B Oil Handling Outfit Saves Time, Labor, & Money for the Boston Elevated Railway Co.*

In the Spring of 1916 the Boston Elevated Railway Co. installed a Gilbert & Barker Oil Storage System in their Eagle Street Car

House. This outfit consists of five sturdy storage tanks of 150 gallons capacity each and five hand-operated automatic measuring pumps. The tanks are located in the car house basement at level of pit floor.

Each tank is piped to a self-measuring pump in the oil delivery room near level of the car tracks in yard. In front of each pump is a separate screened drip funnel and a filling funnel with flush covers.





This handy installation has given very satisfactory service. It avoids waste and seepage attendant with leaky barrels and reduces fire hazard to the irreducible minimum. The ease of draining barrels into tanks, the quickness of drawing oil—on a recent test one gallon of compressor oil was drawn in four seconds—are additional valuable features making for economy of labor.

This G&B installation is typical of scores of others with Electric Railway Companies. The great saving in time, labor and oil and



the elimination of the fire hazard commend this modern Gilbert & Barker Pumps and Tanks Outfit to every up-to-date traction company.

Today is a better day than tomorrow to write for facts and figures. Bulletin 60 will bring them.

## GILBERT & BARKER MFG. CO.

(Established 1865)

Springfield, Mass., U. S. A.





# The Victory Loan and American Business

THE average American business man has taken and is now taking only a middle-of-the-road position regarding the relation of Government bond issues to the problems of American business and American prosperity—and more particularly regarding the value to business in getting a wide distribution of Liberty Bond holdings among the public as a whole.

During every day of warfare it became clearer to all that the one great essential to victory was the **unity** of the Nation. The most powerful and most dangerous weapon that Germany forged against us was the weapon of "propaganda" intended to bring about disagreement among ourselves—jealousies—class divisions—group hatred—dissension, the **one** weapon that could defeat us.

Today American business faces a task at least as great as the task of winning the war—the restoration of normal business activity that we may have prosperity along with peace.

This task, too, will require the

united endeavor of the whole Nation. It cannot be accomplished by any one group or class.

*Continued unity of thought and effort by the whole public in the support of the Government is the greatest safeguard of American business today.*

That is a doctrine that every American business man should practise and preach, in his own interest and in the interest of the country.

The success of that doctrine depends now on the extent to which American business men help to bring about a wide distribution of the securities of the

## Victory Loan

The Government Loan Organization has prepared a booklet on this subject which every American business man should read carefully and thoughtfully. Ask for a copy of

### The Victory Loan

*Its relation to American Business and Prosperity*

GOVERNMENT LOAN ORGANIZATION  
Second Federal Reserve District  
LIBERTY LOAN COMMITTEE  
151 Fifth Avenue New York





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There is *economy of material costs*, and that is the least of your difficulties with an organization of our purchasing power.

There is *economy of conduct*, or the swift and efficient handling of the work, and we will show you our record on that.

Finally, there is *economy of conception*, which involves the ability and the courage to expose either excess or inadequacy in the formative or inceptive stage of an industrial enterprise.

We offer you advice which you cannot buy and which you do not have to pay for.

**THOMPSON-STARRETT COMPANY**  
INDUSTRIAL CONSTRUCTION

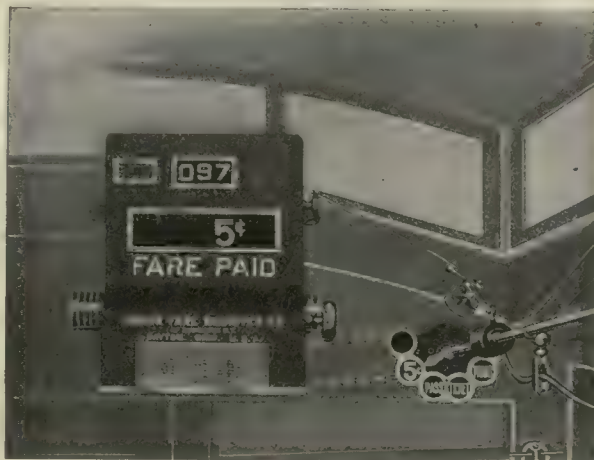
CHICAGO

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PITTSBURGH

*Our Advice is as Good as Our Service*





A No. 39 Type Ohmer Fare Register

# Ohmer Fare REGISTERS

OHMER Fare Registers are made in many different types to meet the many different requirements of the electric railways. Every Ohmer Fare Register, however, whether it is one of the small city type machines with a capacity of but three or four fares, or

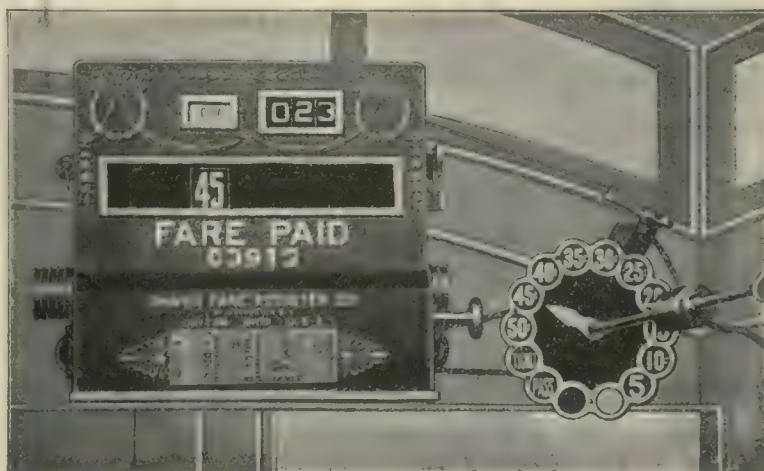
one of the large interurban types registering over a hundred fare denominations, *is built on the same principle. Each fare is clearly indicated as it is registered. A permanent, untamperable record of each fare is printed, together with all other necessary data.*

We illustrate a No. 39 City Type Ohmer Fare Register together with its printed record. We also show a No. 52 Interurban Type, adapted to ordinary interurban service.

Let us explain some of our other types to you. Our experience has shown that we can

TIME	DIRECTION	LINE NO.	TICKETS	PHASES	5¢ FARES	TOTAL CASH	REGISTER NUMBER	TOTAL PASSENGERS	DATE	IDENTIFICATION
4 23P	L	18	0 0 0	0 0 0	0 0 0	\$ 00.00	3	7 4 7 0	DEC	INS8
4 23P	L	18	0 4 2	0 4 7	0 5 6	\$ 09.90	3	7 4 7 0	5	27
3 34P	O	18	0 3 5	0 3 2	0 3 6	\$ 08.15	3	7 3 9 3	5	27
2 25P	L	18	0 2 4	0 1 7	0 2 1	\$ 05.30	3	7 2 9 5	5	27
1 36P	O	18	0 0 7	0 0 9	0 0 8	\$ 02.50	3	7 2 0 1	5	27
12 27P	L	39	0 0 0	0 0 0	0 0 0	\$ 00.00	3	7 1 2 7	5	27
12 27P	L	39	0 7 2	0 7 4	0 6 8	\$ 12.35	3	7 1 2 7	5	14
11 27A	O	39	0 5 9	0 5 5	0 4 3	\$ 09.45	3	7 0 1 2	5	14
10 38A	L	39	0 3 4	0 3 4	0 1 6	\$ 06.90	3	6 8 8 8	5	14
9 29A	O	39	0 1 6	0 1 5	0 0 3	\$ 03.15	3	6 7 6 3	5	14
8 30A	L	39	0 0 0	0 0 0	0 0 0	\$ 00.00	3	6 6 6 6	5	14

Report from a No. 39 Type Ohmer Fare Register



A No. 52 Type Ohmer Interurban Type Register

Registers. We will be glad to advise with you about your fare collecting problems. The services of our experts are at your command without obligation to you.

**Ohmer Fare Register Company**  
Dayton, Ohio, U. S. A.





## The light reversing mechanism stands roughest handling

When the end of the line is reached and there's a big crowd waiting to get on, your conductor is not going to exercise a lot of care in reversing a string of seats—but

# Hale and Kilburn Seats

stand the racket. They can be reversed in a jiffy with no slams or breaks. They're *easy* to turn without effort and their light, steel parts remain remarkably free from breakage. This reversing mechanism is lighter than others—which helps, also, not only to reduce maintenance cost, but the *weight* of the car, as well.

Master mechanics are enthusiastic over them and frequently keep these seats for refitting purposes, after discarding the old car body.

Hale and Kilburn Seats are specified for the country's most progressive roads because correct design, flawless materials and honest workmanship make an unbeatable combination.



## Hale & Kilburn Corp.

Philadelphia  
New York  
Chicago

Washington  
Atlanta  
Louisville

St. Louis  
Detroit  
San Francisco







Type R-5. Double Register

# International Fare Registers

have for nearly a quarter of a century been and are today the standard equipment of a majority of the Electric Railways and City Systems of this country.

Cars equipped with Money Counting Fare Boxes need this visible and audible registration of the Fare Register as an additional check against the Fare Box. Where Non-Registering Fare Boxes are used a Fare Register affords the only method of checking against the Fare Box. Only by their use can the registration of paper tickets and transfers be made.

The test of long service has shown the International to be not only accurate and reliable in their registration but so rugged in construction as to give enduring service. All parts are interchangeable, repairs few and easily made.

Exclusive Selling Agents for  
HEEREN ENAMEL BADGES

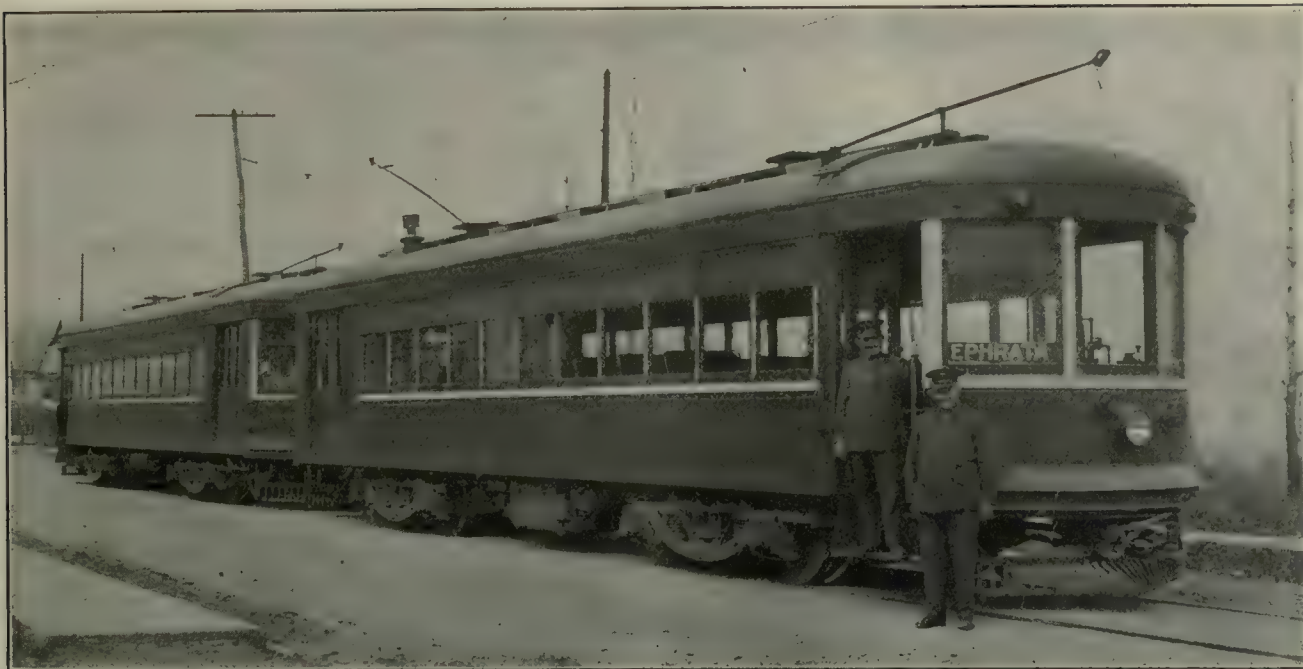
## The International Register Company

15 South Throop Street  
Chicago



Type R-10. Single Register





## What the Ephrata & Lebanon Traction Co. says about **MILLER TROLLEY SHOES** operating under their unusually severe conditions

**O**UR experience in operating the Miller Trolley Shoe extends over a period of eighteen months.

During the fall, winter and spring months we are troubled with very severe sleet conditions. We operate 20-ton cars singly and in trains of two or more cars.

Oftentimes a train will leave the Lebanon Terminus and have practically no sleet until after it passes through south mountain. From then on it encounters severe sleet interference.

The ordinary motorman and conductor, after operating their train for a number of miles without sleet conditions, will do their utmost to finish the trip without placing sleet cutters on in the middle of the run. This makes conditions very severe on the collector, whether it be sliding contact or wheel.

We run at a high rate of speed and our road is anything but straight. When we employed

a 6-inch trolley wheel, it was necessary to discard it at from 4000 to 4500 miles. With the Miller Trolley Shoe, it is only necessary to discard the sliding contact every 7000 or 7500 miles. The shoe itself is practically indestructible. On a comparatively straight road, I think the life of contacts should be nearly double what ours are.

Our cars, being all steel construction, any noise at the contact point of the pole with the trolley wire is naturally transmitted to the interior of the car. When the trolley wheels run at a high rate of speed the bushing very soon becomes worn and causes a very objectionable rumble in the car, oftentimes to the extent that ordinary conversation between the passengers is very difficult if not impossible. With the Miller Trolley Shoe this objectionable noise is entirely overcome and the operation is very quiet."

Need anything more be said about Miller Trolley Shoes to warrant your investigation?

**MILLER TROLLEY SHOE CO.**  
West Newton, Mass.





# Here is the New Columbia Foundry



## Anything in the Line of Castings

**G**REY Iron, Semi-Steel—Bronze Composition. We will make any casting you desire—and make it *well*. Whether it's a 6000-lb. cast-iron base plate for a machine tool or the smallest detail that can be poured, you are assured of a high-grade product. Columbia foundry facilities are now equal to any demand.

## Columbia Machine Works & Malleable Iron Co.

Atlantic Ave. and Chestnut St.

Brooklyn, N. Y.

### TOOLS

Armature and Axle Straighteners  
Armature shaft straighteners  
Armature buggies and stands  
Babbiting molds  
Bending and heading machines  
Car-hoists  
Car replacers  
Coil Taping machines for armature leads  
Coil winding machines  
Pinion pullers  
Pit jacks  
Signal or target switches  
Tension stands

W. R. Kerschner Co., Inc., N. Y.  
Holden & White, Inc., Chicago  
F. F. Bodler, San Francisco  
Railway & Power Eng. Co., Ltd., Toronto, Ont.



### CAR EQUIPMENT

Armature and axle bearings  
Armature and field coils  
Bearings (axle and armature)  
Brush-holders and brush-holder springs  
Brake, door and other handles  
Brake forgings, riggings, etc.  
Car trimmings  
Commutators  
Controller handles  
Forgings of all kinds  
Gear cases (steel or malleable iron)  
Grid resistors  
Third-rail shoe beams and accessories  
Trolley poles (steel) and wheels

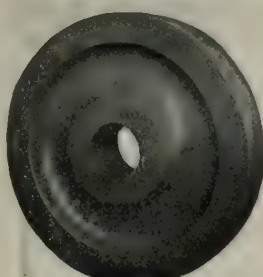




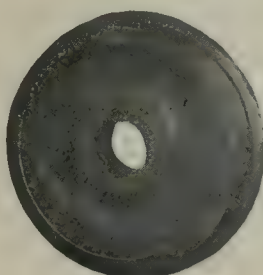
Gear Blank



Street Car Wheel



Double Flange Crane Wheel



Industrial Wheel



Turbine Bucket Wheel

# CAMBRIA CIRCULAR ROLLED AND FORGED SECTIONS



32-Inch Mill Rolling Ingot Into Round Bar

**T**HESE give superior service because of the thorough working which the steel receives at every step in their manufacture.

For instance, one of the first operations consists in rolling a standard ingot into a cylindrical bar eleven to fifteen inches in diameter, which is cut into blocks varying in length according to the weight desired. This preliminary working produces the very beneficial effect of giving an outer rolled surface which eventually becomes the tread of the wheel or the rim of the blank, as the case may be.

## MIDVALE STEEL AND ORDNANCE COMPANY CAMBRIA STEEL COMPANY

*General Sales Office, Widener Building, Philadelphia, Pa.*

*District Sales Offices: Atlanta, Boston, Chicago, Cincinnati, Cleveland, Detroit, New York, Philadelphia, Pittsburgh, San Francisco, Salt Lake City, Seattle, St. Louis*

CONSOLIDATED STEEL CORPORATION, 165 Broadway, New York, is the sole exporter of our commercial products. Address all export inquiries to them.

*"We Want You to Become Better Acquainted With Us" Series. Number 4-1.*





# Way out at San Antonio they're Boyerized

The city of the Alamo is a long, long way from Springfield, Mass.

But the story of a good product travels far and is heeded by the wise ones.

Which explains why the Public Service Company of San Antonio uses so many Boyerized case-hardened pins and bushings.

No matter where you are located, we are ready to serve you with these truck and brake trouble eliminators.

ELECTRIC RAILWAY SUPPLIES

**Bemis Car Truck Company**

SPRINGFIELD MASS

Bemis Trucks  
Case Hardened Brake Pins  
Case Hardened Bushings  
Case Hardened Nuts and Bolts

Manganese Brake Heads  
Manganese Transom Plates  
Manganese-Body Bushings  
Bronze Axle Bearings.



# Electric Steel Forged Car Axles and Armature Shafts

*Made from Electric High-Grade Steel*

Forged and Heat Treated



Particularly Adapted to

## Electric Railway Service

We are equipped to handle the forging of axles and armature shafts from our own manufactured

## Electric Furnace Steel

We do the heat treating and rough or finished machining. We solicit your inquiries for your rigid requirements.

---

*Write us for Comparative Results  
of Open Hearth and Electric Steel*

---

# GENERAL STEEL CO.

Public Service Building, MILWAUKEE, WIS.



## What Would You Think of a Manufacturer—

—who wrote to you with a lead pencil—"We are saving much money because we do not use typewriters and telephones"? You might well wonder whether his merchandise was as much out of date as his business methods.

You know that modern time and labor saving appliances are not added expenses, but that they have superseded slower and more costly processes.

The concern which uses your business paper to tell you its business story is simply using a modern piece of selling machinery to make it easier for you to buy intelligently with the least waste of your time and theirs.

For the right kind of advertising shortens the distance between human minds just as certainly as the railroad shortens the distance between places. It is still possible to walk from New York to Chicago, and it is still possible for a business to get along without advertising, BUT

—bear in mind that the seller who does not advertise does NOT save the cost of advertising, for it costs more to do the work of advertising by other means. Consistent advertisers are progressive merchandisers, and it pays to do business with them.

You are invited to consult us freely about  
Business Papers or Business Paper Advertising.

### THE ASSOCIATED BUSINESS PAPERS INC.

*The International Association of Trade and Technical Papers*  
Headquarters, 220 West 42nd Street, New York

National Druggist  
National Petroleum News  
Nautical Gazette  
Northwestern Druggist  
Power  
Power Boating  
Power Plant Engineering  
Price Current—Grain Reporter  
Railway Age  
Railway Electrical Engineer  
Railway Maintenance Engineer  
Railway Mechanical Engineer  
Railway Signal Engineer  
Retail Lumberman

Rubber Age  
Shoe Findings  
Shoe and Leather Reporter  
Shoe Retailer  
Southern Engineer  
Southern Hardware & Implement  
Journal  
Sporting Goods Dealer  
Starchroom Laundry Journal  
Tea and Coffee Trade Journal  
Textile World Journal  
Timberman  
Transfer and Storage  
Woodworker

### LIST OF MEMBERS

*Each has subscribed to and is maintaining the highest standards of practice in their editorial and advertising service.*

Advertising and Selling  
American Architect  
American Blacksmith  
American Exporter  
American Funeral Director  
American Hatter  
American Machinist  
American Paint Journal  
American Paint and Oil Dealer  
American Printer  
American School Board Journal  
Architectural Record  
Automobile Dealer and Repairer  
Automotive Industries  
Boot and Shoe Recorder  
Brick & Clay Recorder  
Buildings & Building Management  
Bulletin of Pharmacy  
Canadian Grocer  
Canadian Railway & Marine World  
Candy and Ice Cream  
Chemical and Metallurgical  
Engineering  
Clothier and Furnisher  
Coal Age  
Coal Trade Journal  
Concrete  
Cotton  
Daily Iron Trade & Metal Market  
Report  
Domestic Engineering  
Dry Goods Economist  
Drygoodsman  
Dry Goods Reporter  
Electric Railway Journal  
Electrical Merchandising  
Electrical Record  
Electrical Review  
Electrical World  
Embalmer's Monthly  
Engineering World  
Engineering and Mining Journal  
Engineering News-Record  
Factory  
Farm Machinery—Farm Power  
Foundry (The)  
Furniture Manufacturer & Artisan  
Furniture Merchants' Trade  
Journal  
Gas Age  
Gas Record  
Grand Rapids Furniture Record  
Haberdasher  
Hardware Age  
Heating & Ventilating Magazine  
Hide and Leather  
Hotel Monthly  
Illustrated Milliner  
Implement and Tractor Age  
Industrial Arts Magazine  
Inland Printer  
Iron Age  
Iron Trade Review  
Lumber Trade Journal  
Lumber World Review  
Manufacturers' Record  
Manufacturing Jeweler  
Marine Engineering  
Marine Review  
Metal Worker, Plumber & Steam  
Fitter  
Mining and Scientific Press  
Modern Hospital  
Motor Age  
Motorcycle & Bicycle Illustrated  
Motor World  
National Builder



# **"STANDARD"**

Steel Tires

Steel Tired Wheels

Solid Rolled Steel Wheels

O. H. Steel and Malleable Iron Castings

Solid Forged Gear Blanks

Steel Forgings

Iron Forgings

Forged and Rolled Steel

Pipe Flanges

Ring Dies

Rings

Roll Shells

Steel Springs



*"The 'Standard' Brand on your material  
is an assurance of eventual economy."*



## **STANDARD STEEL WORKS CO.**

GENERAL OFFICES:

**MORRIS BUILDING, PHILADELPHIA, PA.**

CHICAGO  
ST. LOUIS  
HAVANA, CUBA

RICHMOND  
SAN FRANCISCO  
NEW YORK  
MONTEREY, MEX.

MEXICO CITY  
LONDON, ENGLAND  
PARIS, FRANCE



THERE ARE THREE VALUES  
FOR RAILWAY COMPANIES IN  
THE SPECIFICATION and USE OF

# CYPRESS

"THE WOOD ETERNAL"

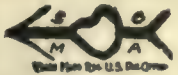
for Crossarms, Car Material,  
Fencing, Station Construction  
and similar railway purposes:

First, the vastly longer life of  
the material itself. *All-Heart  
Cypress* is pretty nearly *proof*  
against the action of decay.

Second, the

## SAVINGS OF LABOR COSTS IN YOUR MAIN- TENANCE WORK

Obviously the longer the serviceable life  
of the lumber you use, the less you are  
going to have to repair and replace. That  
of course means not merely saving in cost  
of material, but also saving in the much  
bigger item—*cost of labor*.

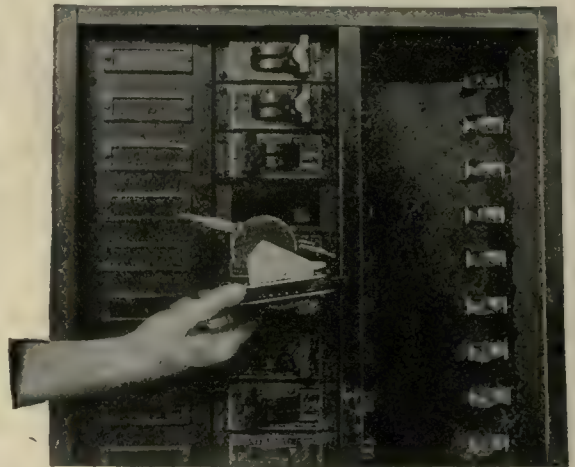
Third, when you specify Cypress you  
can know *definitely* that you get what  
you pay for IF you see THIS MARK.  
This mark  is on the ends of  
every piece of Cypress cut by  
the responsible mills in this Association.  
It is a guarantee that the material bear-  
ing it is made, *and graded at the mill*, in  
accordance with the scrupulously high  
standards demanded by this Association  
and the best customers of its members.

These *values* are worth *getting*. The  
*facts* are worth *remembering*.

*Our data is at your service.*

## SOUTHERN CYPRESS MFRS.' ASS'N

1265 Hibernia Bank Building, New Orleans, La. or  
1265 Heard National Bank Building, Jacksonville, Fla.



## Safety with 600 Volts insured by using Krantz Railway-Type Safety Panel Boards



600-volt circuits  
are dangerous to life.

Provide absolute safety to em-  
ployees by using Krantz Railway-  
Type Safety Panel Boards for con-  
trolling the lighting and heating circuits  
in electric railway stations.

Impossible to touch live parts when op-  
erating switches. Each switch is a separate  
unit that can be removed without danger,  
and without interfering with other circuits.

Used by some of the largest subways and  
elevated roads.

Ask for Miniature Catalogue 1B-5.

Westinghouse Elec. & Mfg. Co.  
East Pittsburgh, Pa.



Showing ease of  
removal of in-  
dividual switch.





TRADE MARK  
REG. U. S. PATENT OFFICE.

## The Standard for Rubber Insulation

Power Cables—Signal Wires—Car Wires  
Motor Leads, etc., etc.

Steel Armored—Lead Covered—Braided

*We Manufacture*

Okonite (Rubber) Insulated Wires and Cables  
Varnished Cambric Insulated Wires and Cables

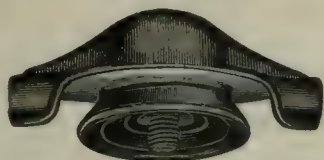
Okonite Tape—(Rubber Insulating)  
Manson Tape—(Rubber Filled Cloth)

*Samples and Estimates on Application*

**THE OKONITE COMPANY, Passaic, New Jersey**

CENTRAL ELECTRIC CO., Chicago, Ill., General Western Agents

F. D. Lawrence Electric Co., Cincinnati, O. Novelty Electric Co., Philadelphia, Pa. Pettingell-Andrews Co., Boston, Mass.



## You Can Minimize Overhead Repair Work

and successfully cut maintenance costs if you turn to

## The Macallen Line

of strain insulators, hangers, splicing ears, crossings, and other overhead material.

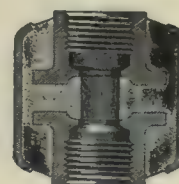
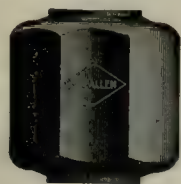
They are "specialty" products, designed and built to make "Macallen" the standard on American railways.

It will pay you to write for information and prices.

## The Macallen Insulating Joint

Adopted by principal air brake manufacturers as part of their standard equipment. Also insulates steam pipes, etc. Shell is seamless drawn steel, nipples are machined from steel rod, and insulating material is Macallen Vulcanite Compound, not affected by heat or oil—practically indestructible.

May We Send Our Catalog?



**The Macallen Company**  
Macallen and Foundry Sts., Boston







The **ECONOMY** is the pioneer that opened up the renewable fuse field. This is the fuse with the incomparable renewal element—the “Drop-Out” Link.

An inexpensive “Drop-Out” Renewal Link restores a blown Economy Fuse to its original efficiency. It does away with the need of powdered filler. Even a novice can replace the link and renew the fuse in a jiffy.

## ECONOMY Renewable FUSES and “Drop-Out” Renewal Links

are used in thousands of plants, large and small, representing all branches of industry. Their efficiency and economy have been proved over and over. They are uniformly accurate in rating. As compared with the use of one-time fuses, they cut annual fuse maintenance costs 80 per cent.

In the course of a year the average plant runs up a considerable bill on fuses. The economy effected by the Economy Fuse is worthy of your notice. A comparative fuse test will quickly convince you of this, as it has innumerable others in the electric traction field.

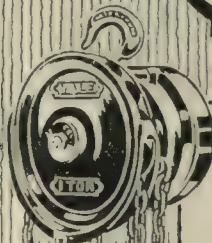
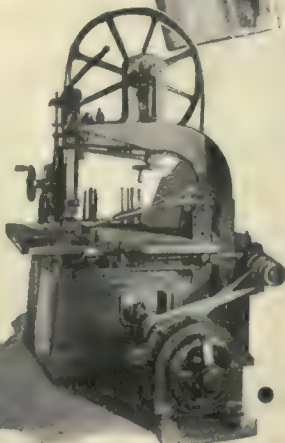
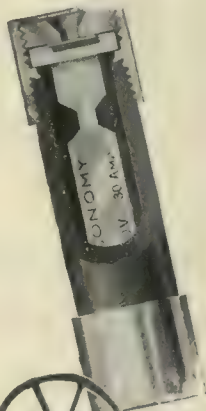
Write for Catalog 17

### ECONOMY FUSE & MFG. CO.

Kinzie and Orleans Sts.  
CHICAGO, U. S. A.

Sole manufacturers of “AR KLESS”—the Non-Renewable Fuse with the 100 Per cent. Guaranteed Indicator

ECONOMY FUSES ARE  
ALSO MADE IN CANADA  
AT MONTREAL.



## Hoists of Steel

Fifty years' experience has taught us how to build Yale Spur-Gear Chain Hoists

THE skill of the designing engineer; the research of the metallurgical engineer; the use of one steel for wearing parts; the use of another for load tension and shocks; the choice of a steel for torsional strains; the adaptation of heat treatments; the exceptional workmanship; the exacting inspections and rigid tests *all* result in the Yale Hoist.

### ‘From-Hook-to-Hook- a-Line-of-Steel’

For sale by Machinery Supply Houses. Catalog 18D. tells all Do you want a copy?

**For a Factory Locking  
Equipment use a Yale  
Master-key System.**

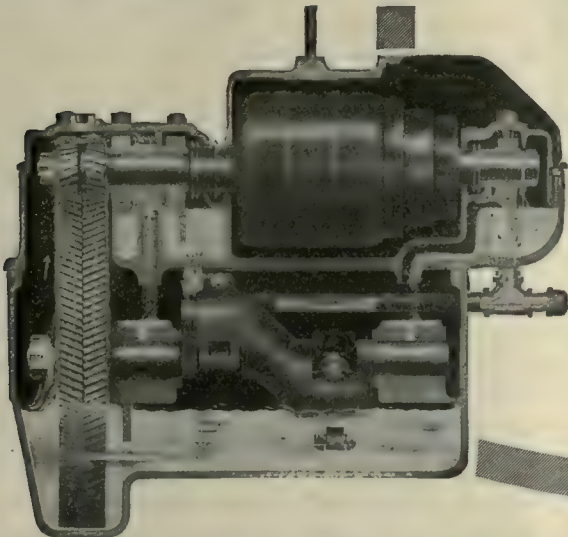
Write for Particulars

The Yale & Towne Mfg. Co.  
9 East 40th Street New York City





# Compressors for Air Brake Equipment—



## Lubrication—

The thoroughness with which this important detail has been worked out is an index to the complete design and careful construction of these improved compressors for air brake equipments.

*Let us tell you more about them.  
Send for Bulletin 1525-A.*

# ALLIS-CHALMERS

Milwaukee, Wis. U.S.A.

DU PONT AMERICAN INDUSTRIES

## IN CASES OF NECESSITY

In the present construction era the demand for railway extension makes it imperative that more attention be given to the selection and use of explosives in grading, tunneling and other cases of necessity.

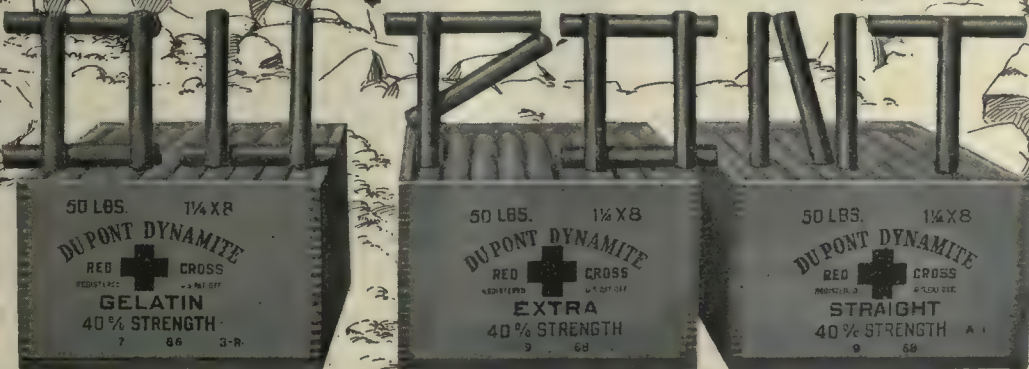
The introduction of RED CROSS Explosives and the use of correct detonation methods are steps that speed up road building by making possible greater daily progress.

Red Cross Explosives are manufactured by the largest makers of explosives, whose century of experience enables them to produce explosives especially adapted to the requirements of railroad construction—in fact, to make explosives for every blasting condition.

For information about Red Cross Explosives, write for a free copy of our "High Explosives Catalog." Address Advertising Division,

**E. I. du Pont de Nemours & Co.**

Powder Makers Since 1802      Wilmington, Delaware



DU PONT



# NOARK FACTORY TESTS INSURE PERMANENT SERVICE

## The High Factor of Safety in "Noark" Renewable Fuses

**B**OTH in the careful manufacture, where the best raw materials and experienced designing meet—and in the constant factory tests throughout each step in the making—there is the assurance that when you use "Noark" Renewable Fuses—you safe-guard your equipment with the best of this type.

"Noark" Renewable Fuses forged to the front from the moment they were put on the market, because of their many superior features. They stay there because of the service they give.

*To the Trade:* "Noark" Renewable Fuses and all other Johns-Manville packaged materials are distributed strictly through jobber-dealer channels on a basis that means profits.

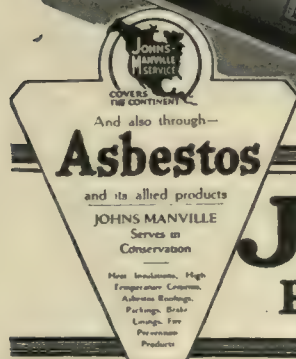
**H. W. JOHNS-MANVILLE CO.**

New York City

10<sup>1</sup>/<sub>2</sub> Factories—Branches in 63<sup>1</sup>/<sub>2</sub> Large Cities



Manufactured by  
the Johns - Pratt  
Co., Hartford, Ct.,  
H. W. Johns-Man-  
ville Co., Sole  
Selling Agents.



# JOHNS-MANVILLE

## ELECTRICAL MATERIALS

## *There is a good story about Kipling*

A friend sent him a copy of a magazine with the advertising pages torn out. Kipling wrote back: "Send me the ads next time. I can write stories myself."

This reminds us of a concern in Pennsylvania that subscribes to four McGraw-Hill papers just for the *Searchlight* ads.

Do you read the *Searchlight* Section of this paper each week? If not, you may be passing up a great opportunity. These ads are up-to-the-minute news of the industry this paper covers—a true barometer of business conditions; some of them may be published just for *your* benefit. Be sure and look them over *every week*. Start *now!*

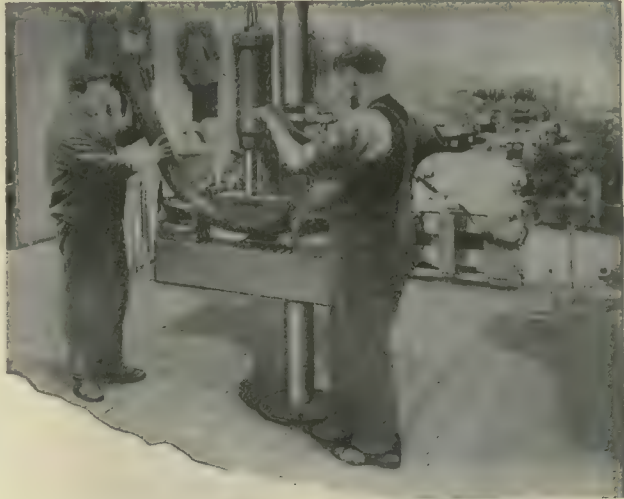
**Read the Searchlight Section in this issue**



## This Hydraulic Bender Will Bend Your Conduit Pipe, Straighten Trolley Poles, Etc., Rapidly and Accurately

It is built in standard sizes of thirty to forty tons capacity, sufficient to bend one-inch to six-inch pipe.

The base is ribbed so that the lower bending block may be placed wherever desired. One set of blocks is needed for each size of pipe, the change from one size to another being readily made.



30-Ton Hydraulic Bender  
Bending 4 in. Pipe

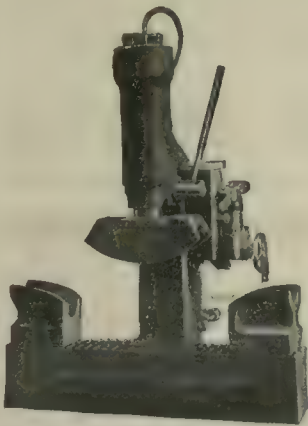
We build many sizes of hydraulic benders. All as carefully designed as the above to give the user the best service. Wherever car frames, rails, pipe, shafting, etc., is bent, one of our many benders can invariably be profitably used.

Our line of over 4000 complete machines, including jacks, punches, shears, accumulators, pumps, presses, valves, fittings, packings, etc., is illustrated and described in catalog form, free for the asking.

*Write for Catalogs*

### The Watson-Stillman Co.

Engineers and Builders of Hydraulic Machinery  
46 Church Street, New York  
Chicago—McCormick Bldg.



259



Engineers specify  
"PRUDENTIAL"  
Buildings and save  
your clients' money.  
Secure an agency and  
earn money for your-  
self.



## A Ground Floor Proposition For You

# "PRUDENTIAL" STEEL BUILDINGS

Are made of steel plates, heavily galvanized and formed by powerful presses into standard unit sections.

Use these sections to build your freight shed, when no longer needed take it down and reassemble it as signal boxes, or move it over to the new construction work and turn it into a bunk house.

These are but a few of the many applica-

tions for "Prudential." If you really wish to save money for your company, before building anything you will ask, can it be made the "Prudential" way, for a "Prudential" Building saves you money as long as it is on the job.

*Write today for full particulars—  
Catalog 230*

### THE C. D. PRUDEN COMPANY, Inc.

Bayard and Warner Streets, Baltimore

56 Pine Street, New York



# Metal Fare Tokens



Enlarged to 1½ times actual size

Nickel-Silver  
Bronze or Brass

Designs developed according to your ideas and subject to your approval. We make the metal, the dies and the tokens.

We have the experience, the equipment, the capacity for rapid quantity production.

*Information on request.*

## Scovill Mfg. Co.

*Established 1802*

Waterbury, Conn.

New York  
Chicago

Boston  
Detroit



## BOUND-BROOK

GRAPHITE AND BRONZE. TRADE MARK REG. U. S. PAT. OFF.

### Trolley Wheel Bushings

The less attention your trolley wheel bushings require, and the longer they last, the lower go your maintenance costs.

Plain bushings are costly at the best, for they present a problem in lubrication which demands constant watching—an excessive expenditure of time and labor.

Bound Brook (Oil-less) Trolley Wheel Bushings eliminate much of this care and expense—for they are always adequately lubricated, *whether attended to or not.*

Whatever slight difference there may be in the initial cost is more than offset by their long wearing qualities and economy of maintenance.

For Bound Brook Bushings last far longer, under every condition of service, than any other bushing of whatever type.


*All Genuine Graphited Oil-less Bushings have always been made at Bound Brook, U. S. A.*

**Bound Brook Oil-less Bearing Co.**  
**Bound Brook                      New Jersey**

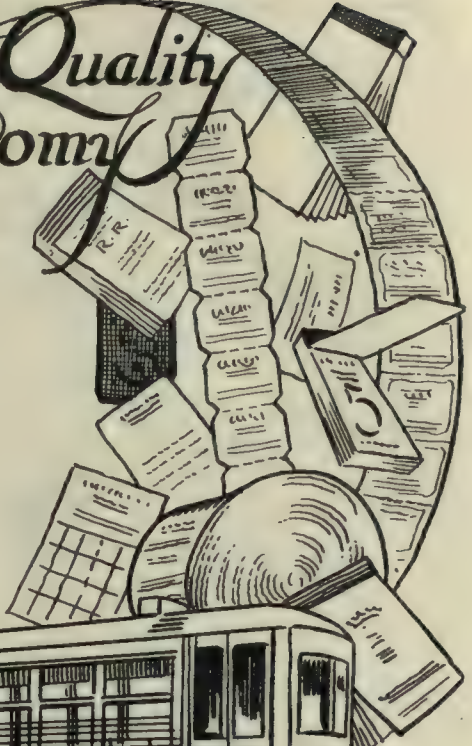
Detroit Office: 1723 Ford Bldg.

*"Specialists in the manufacture of Oil-less Bushings for more than a third of a century"*





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Cuts 1 1/4 in.  
from the edge.

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*Are Made of Tool Steel*


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The B-V quality never fluctuates. It's staunch and true in every punch of our 100 varieties.

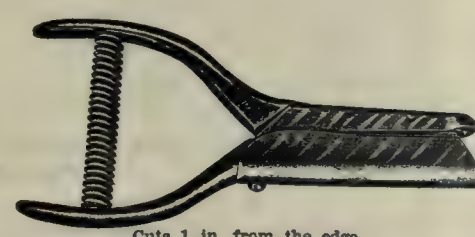
*Orders can be promptly filled  
owing to our augmented facilities*

**BONNEY-VEHSLAGE TOOL CO.**  
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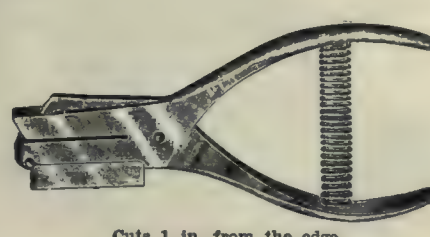
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Cuts 1 in. from the edge.

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## Better Lubrication with HENSLEY TROLLEY WHEELS

*Due to  
THIS*



There is a grease cavity around the hub. When the wheel revolves, the centrifugal force drives the lubricant to the outer portion of the cavity. It is caught in slots and automatically fed to the wearing surface of the spindle.

*Like THIS*



Thirty miles an hour means 30 revolutions per second for the trolley wheel. This requires perfect lubrication.

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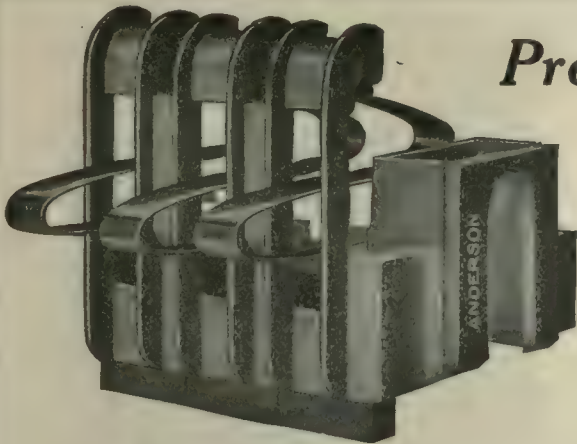
The planetary gearing, *all steel* working parts and the patented loop hand chain guide insure strength, durability and safety in operation at any angle or speed. A Tribloc is so efficient and so well made, we guarantee it for five years. You're as safe in buying it as the workmen are in using it.

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OVER SEAS REPRESENTATIVE  
ALMACOA ALLIED MACHINERY COMPANY OF AMERICA ALMACOA  
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# Protect Your Commutators

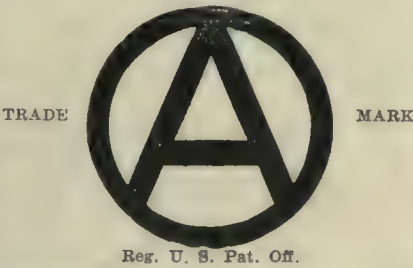
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Brushes can be easily inspected and renewed — recessing of brushes is unnecessary and constant brush pressure is assured. No pigtails required. Like the Anderson Line to which they belong—they are dependable.

eliminate “brush chatter” and prolong the life of your commutators. Perfect contact is secured under all sorts of conditions. Lindall Brush Holders increase operating efficiency in more than one way.

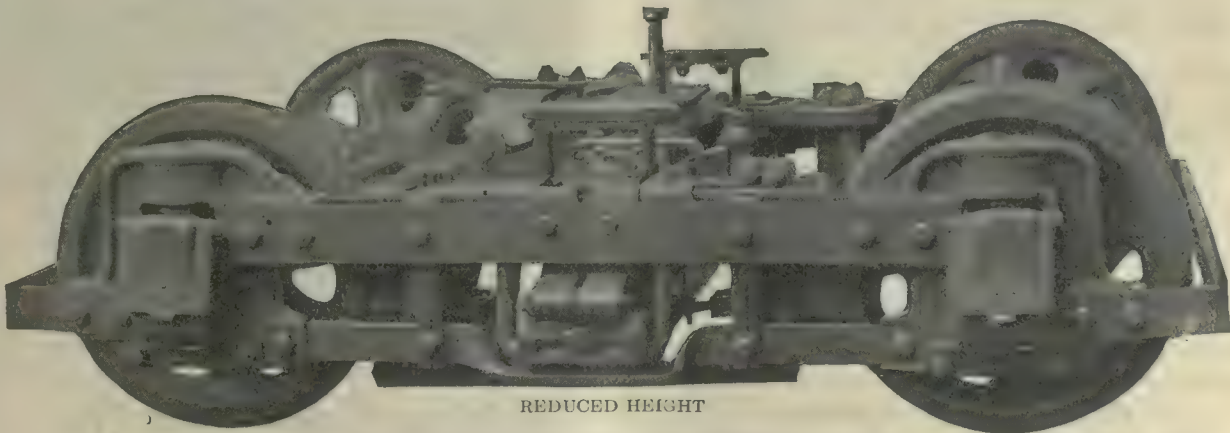
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Established 1877  
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Established 1892

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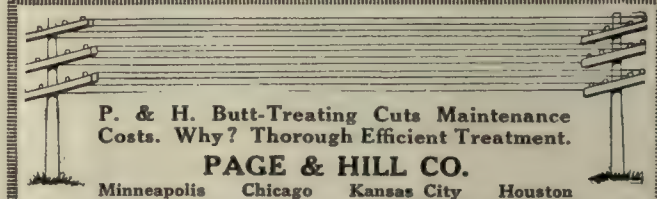


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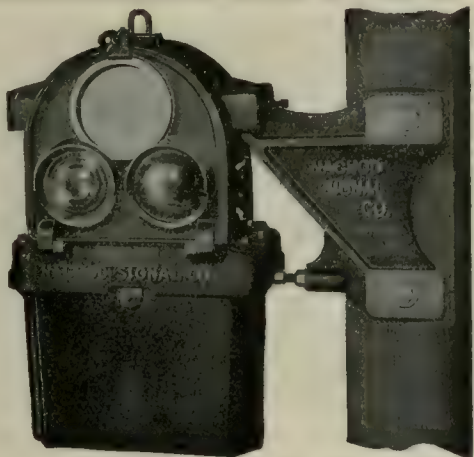
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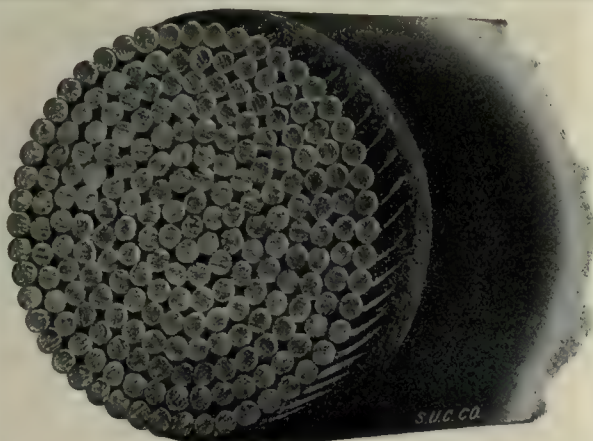
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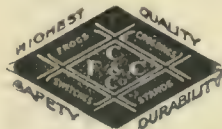
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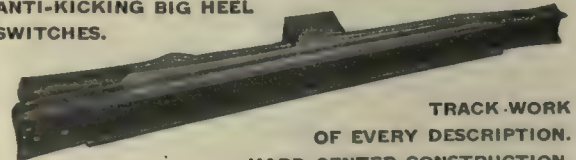


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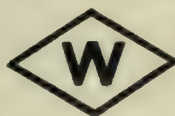


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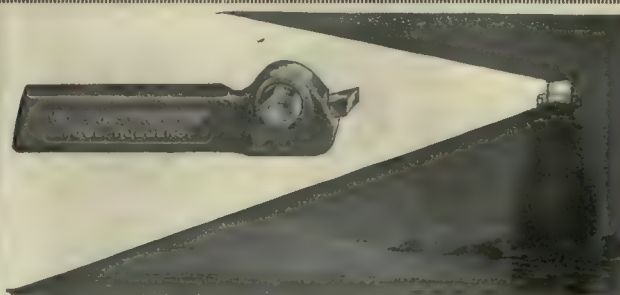
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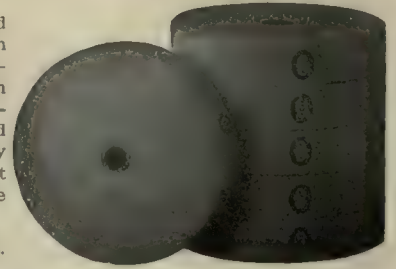
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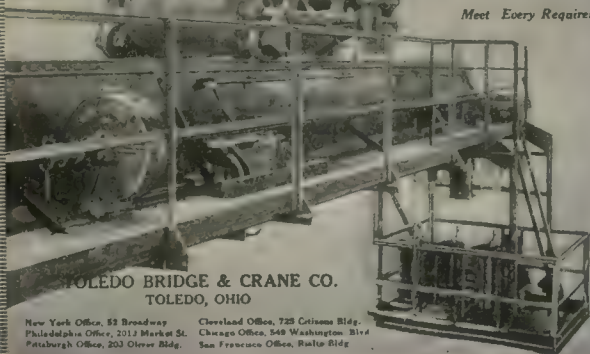
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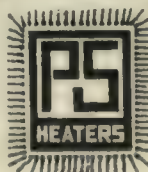
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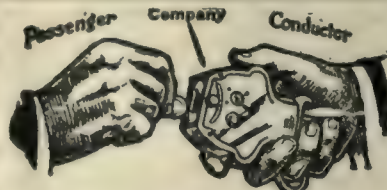
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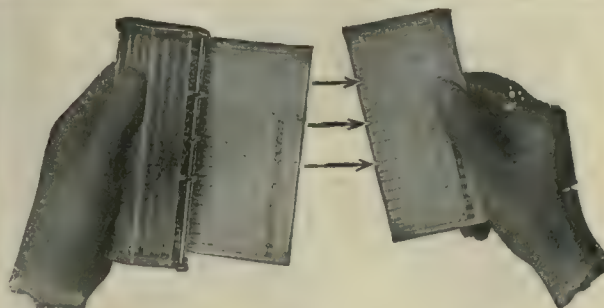
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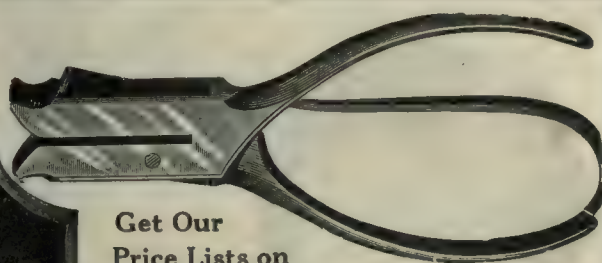


**W**HILE waiting for that just increase in future fares, make certain that you have an adequate check *now* on every *present* cash fare. You can get it with the

## Macdonald Ticket and Ticket Box System

*Let us show you how it saves money, saves disputes, saves time and makes tax reports easy.*

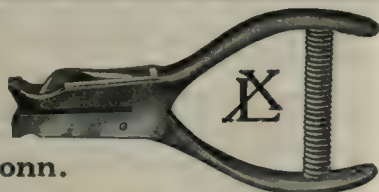
The Macdonald Ticket & Ticket Box Co.  
Cleveland, Ohio



Get Our  
Price Lists on  
**BADGES** and  
**PUNCHES**

AMERICAN RAILWAY SUPPLY CO., 134-136 Charles St., New York

**EXELL  
MFG. CO.**



New Haven, Conn.

### Railroad and Tram Car Specialties

New inventions developed, perfected and worked for the English market

**Messrs. G. D. Peters & Co., Ltd.**

Windsor Works, Slough, (Bucks), Eng.

**MASON SAFETY TREAD**—lead or carborundum filled; non-slippery; prevents accidents; cuts out damage suits.

**KARBOLITH OAR FLOORING**—for steel cars; is sanitary, light weight, fire proof, non-slippery.

**STANWOOD STEPS**—Self-cleaning, non-slippery, light.

Our products used on all leading railroads, on cars and stations. For details address:

**AMERICAN MASON SAFETY TREAD CO., Lowell, Mass.**  
Branch Offices: Boston, New York City, Philadelphia.  
Agencies in all principal cities.

## Heating and Ventilating

Let us demonstrate to you how we can heat and ventilate your cars at the lowest possible cost

**The Cooper Heater Company**  
Carlisle, Pa.



## Trolley Poles From Stock

We have on hand for immediate shipment thousands of high grade Butt Welded poles—made from special high carbon skelp. Sufficiently flexible but without taking a permanent bend at 35 to 40 pound wheel pressure.

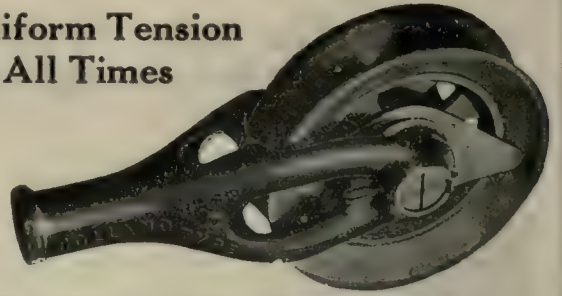
R. D. Nuttall Co.  
Pittsburgh, Pa.

### Nuttall Gears

EVERY GEAR REGISTERED



## Uniform Tension At All Times



*Will your present Contact Spring give you this? Ours will.*

*Investigate the "Harp with the big Contact Spring."*

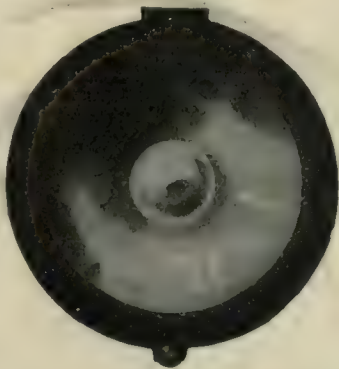
The Holland  
Trolley Supply Co.  
Cleveland, O.

## The Kalamazoo Trolley Wheels

have always been made of entirely new metal, which accounts for their long life WITHOUT INJURY TO THE WIRE. Do not be misled by statements of large mileage, because a wheel that will run too long will damage the wire. If our catalogue does not show the style you need, write us—the LARGEST EXCLUSIVE TROLLEY WHEEL MAKERS IN THE WORLD.



THE STAR BRASS WORKS  
KALAMAZOO, MICH., U. S. A.



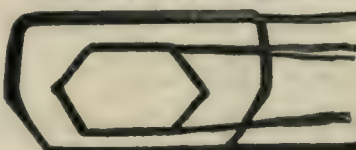
## The McLain No. 25 Headlight

gives powerful road illumination, at the same time eliminating glare. It is an extended dash type light made of Pressed Steel throughout, assuring light weight without any sacrifice in strength or durability. It is absolutely waterproof, weather proof and solid.

Concentrated filament type using either a 23 or 36 watt lamp. It's the **LIGHTEST, BRIGHTEST, TIGHTEST** headlight on the market and it doesn't cost any more than the others.

The Trolley Supply Co., Canton, Ohio

Armature and Field Coils—Armatures Rewound



Commutators  
Refilled  
Prompt Service

THE KING-COIL MFG. CO., CLEVELAND, OHIO

The Most Successful Men in the Electric Railway Industry read the

ELECTRIC RAILWAY JOURNAL

Every Week

## UNIVERSAL ANTI-SLIP TREADS

cars and station steps.

Universal Safety Tread Company  
Waltham, Mass.



See the Crank of the

## CREGHEAD DESTINATION SIGN

By means of it, conductor or motorman can change sign without leaving platform. All that has to be done is to turn the crank. Better investigate.

CREGHEAD ENGINEERING CO., CINCINNATI, O.





**PERLEY A. THOMAS  
CAR WORKS**

Manufacturer of Cars  
and Car Materials

Cars of all types from one-man to large  
interurban

HIGH POINT, N. C.



SASHES, DOORS  
INTERIOR FINISH  
VESTIBULES AND FRAMING

CURTAINS, VENTILATORS  
SASH AND DOOR TRIMMINGS  
DOOR AND STEP MECHANISM

**Tool Steel**

On the basis of experience Carnegie Steel Company recommends for tools its **Carbon Tool Steels** made in the electric furnace. They will serve the requirements of the tool maker for many purposes as well as the more expensive alloy steels.

Tool steels are marketed through Carnegie Warehouses. Quotations and literature can be had from any Carnegie Office.

**Carnegie Steel Company**  
General Offices, Carnegie Bldg., Pittsburgh, Pa.

1211

**PYRAMID BRUSHES**



Trade Mark

**Standard for Electric Railway Motors**

Even on the less severe services Pyramid Brushes have plenty of opportunities to show their worth. On electric railway motors, where high speeds, short stops and quick get-aways are the rule, **PYRAMID BRAND** Brushes pay dividends out of all proportion to their cost.

**National Carbon Company, Inc.**  
Cleveland, Ohio



Take a new Tip, when both sides of old tip are worn out. Snap it on your Triggerlock finger, which stays on the controller, saving removal and adjustment. Time and money are saved. 100,000 renewal tips and 250,000 fingers sold last year.

**Triggerlock Reversible Controller Finger**  
814-18 Bath Ave. 557 King St., West  
Niagara Falls, N. Y. Toronto, Canada

**MORE-JONES**

Armature Babbitt Metal is unusually long wearing and eliminates the tremendous expense of frequent reabbtting.

Designed particularly for electric railway armature bearing service, and recognized the world over for unexcelled quality.

**BABBITT METAL**

**More-Jones Brass & Metal Co.**  
St. Louis, Mo., U. S. A.

**Wheel Truing Brake Shoes**

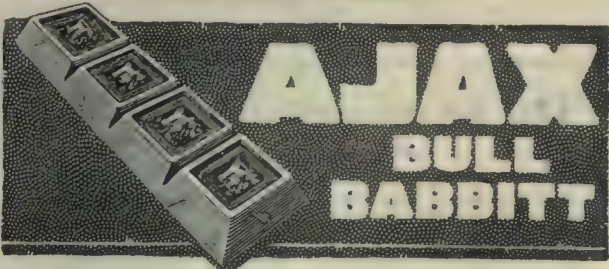


Cut No. 8 operates upon entire width of tread of wheel and only portion of flange next to tread. This is done with the car in service. No pull-ins necessary. Cut above represents only one of many styles of grinding shoes. Send for further data.

**WHEEL TRUING BRAKE SHOE CO.**  
Detroit, Michigan

WITH absolute sincerity we make the statement that **AJAX BULL BABBITT** is Physically and Chemically the Scientifically Correct Babbitt. "Most dependable—Most economical."

**THE AJAX METAL COMPANY** Established 1880  
Main Office and Works: Philadelphia, Pa.  
Southern Plant: Birmingham, Ala.





# The Electric Railway Industry is "coming back"

AS A GREAT NATIONAL INSTITUTION, essential to modern civilization, it cannot fail to do so. Present conditions will change. The industry must and will progress. Years of optimism, activity and expansion lie before us.

AN IMPORTANT ELEMENT in the return of prosperity on an abiding basis is the widest possible dissemination among electric railway men of information that will help them to improve their service, their finances and their public relations.

**P**RACTICAL HELPS for the Electric Railway Shop, Track, Power, Line and Rolling Stock Departments supplies this type of information in abundant measure.

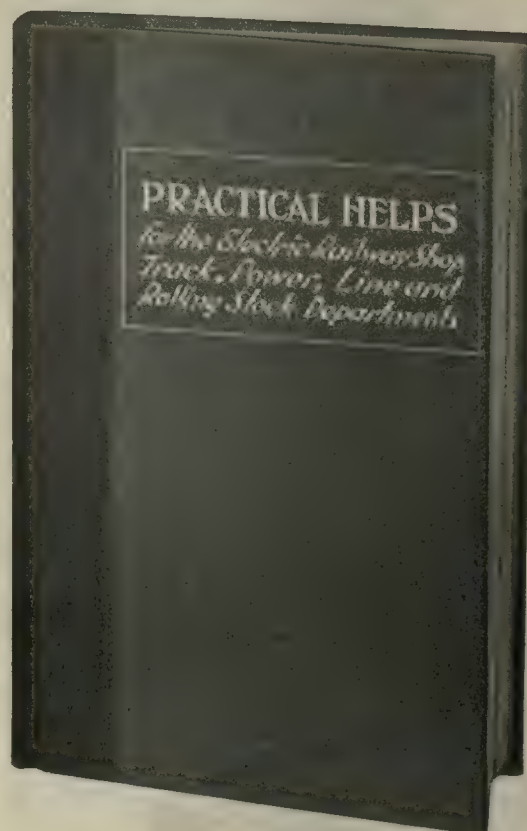
It is a new book, written out of the experiences, investigations and observations of men of recognized ability and of the highest standing in the industry.

**C**OMBINING the authoritativeness of a textbook with the serviceableness of a handbook of present-day practices, it covers the whole range of physical equipment—operation and maintenance, fundamental principles and practical methods, materials and appliances, organization and department economies.

Presenting 29 important articles that were followed with keen interest by the thousands of executives, engineers, operating and non-technical men who first read them in *Electric Railway Journal*—it is a book that belongs on the desk of every electric railway official or department head.

**T**HE BOOK may be secured in combination with a subscription—either new or a renewal—to *Electric Railway Journal*, whose news, week by week, of the thought, activity, practice and progress of the great industry which it serves, is now, more than ever, of vital necessity to the men whose brains and energy will rehabilitate electric railways.

To make sure of YOUR copy, write your name and address in the coupon below, tear it off, and mail it without delay.



325 pages, 6 x 9 in. Well illustrated.  
Thoroughly indexed. Cloth bound.

## CONTENTS

- Section I—(5 Chapters)—Tracks and Structures, by R. C. Cram, Asst. Engr. Way and Structures Dept., Brooklyn Rapid Transit System.
- Section II—(7 Chapters)—In the Power House, by Hartley LeH. Smith, Engineer of Tests, Brooklyn Rapid Transit System.
- Section III—(7 Chapters)—Out on the Transmission Line, by Charles R. Harte, Construction Engineer, The Connecticut Company.
- Section IV—(7 Chapters)—Car Equipment, by C. W. Squier, Electrical Engineer.
- Section V—(3 Chapters)—Car Design, by Norman Litchfield.

-----TEAR OFF HERE-----

ELECTRIC RAILWAY JOURNAL,

Tenth Ave. at 36th St., New York

Send me ELECTRIC RAILWAY JOURNAL for one year, and include a copy of "Practical Helps for the Electric Railway Shop, Track, Power, Line and Rolling Stock Departments." If the book is not satisfactory, I will write you in 10 days for mailing instructions and postage for its return at your expense. If it pleases me, I will remit \$4.85 in 30 days, in full payment of both the book and the paper. (In Canada, \$6.35; in Foreign Countries, \$7.85.)

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City ..... State .....

Company ..... Position ..... AD-PH

**Mail  
this coupon  
TODAY**



# SEARCHLIGHT SECTION

## Get Your Wants into the Searchlight

### ADVERTISING RATES

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(Solid, in one paragraph, without display.)

**THREE CENTS A WORD**, minimum charge 50 cents an insertion, payable in advance, less 10 per cent, if one payment is made in advance for four continuous insertions—for advertisements under:  
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Evening Work      Salesman Wants Con-  
Wanted      nections

**FIVE CENTS A WORD**, minimum charge \$1.50 an insertion, for advertisement under:

Agencies Wanted	Positions Vacant
Agents Wanted	Partner Wanted
Business Opportunities	Representations Wanted
Desk Room for Rent	Salesmen Wanted
Educational	Patents for Sale
Employment Agencies	Plants for Sale
Desk Room Wanted	Sub-Contracts Wanted
Foreign Business	Work Wanted
Miscellaneous for Sale, for Rent or Want Ads.	

**THIRTY CENTS A LINE**, minimum five lines, for all undisplayed advertisements set with a paragraph for each item or tabulated.

**THREE DOLLARS AND SIXTY CENTS AN INCH** for advertisements for bids (Official Proposals).

#### Ads Set in Display Type

(Individual space, within border rules.)

Space for these advertisements is sold by the inch. Each page contains 30 inches. The rate per inch is based on the total number of inches to be used—that is, the number of inches the advertisement is to occupy multiplied by the number of insertions it is to receive. For instance, a 2-inch advertisement in 2 issues earns the 4-inch rate of \$7.80 an inch. A 1-inch space for 4 issues, or a 4-inch space in one issue, also earn the 4-inch rate.

#### SCHEDULE OF RATES

1 to 3 in., \$3.00 an in.	15 to 26 in., \$2.70 an in.
4 to 7 in., 2.90 an in.	27 to 49 in., 2.60 an in.
8 to 14 in., 2.80 an in.	50 to 99 in., 2.50 an in.

Rates for larger space furnished on request.

*For quick and satisfactory results  
tell the reader everything that  
he will want to know.*

### INFORMATION

**ALLOW FIVE WORDS** for the address, if replies are to a box number in care of any of our offices. There is no extra charge for forwarding replies.

**IN REPLYING TO ADS**, do not enclose original testimonials or anything that you may want returned. State your experience and qualifications in as concise and neat a manner as possible and enclose copies of your testimonials.

**BE CAREFUL TO PUT ON ENVELOPE**, when answering any "blind" ad, the box number in the ad, the name of the paper, and also the local address of office to which reply is sent:

36th St., at 10th Ave.,	New York
935 Real Estate Trust Bldg.,	Philadelphia
637 Leader-News Bldg.,	Cleveland
1570 Old Colony Bldg.,	Chicago
519 Newhouse Bldg.,	Salt Lake City
501 Riatta Bldg.,	San Francisco

**WHEN ADVERTISING MACHINERY**, use your own name and address—or a local address of some kind—so that the readers can wire direct and get quick replies. We advise also that you state in your advertisement the present location of plant that is offered for sale, or point of delivery provided you are in the market for equipment.

**TO SIGN YOUR NAME** and address to your advertisement begets the confidence of the reader and facilitates receiving replies. You can, however, obviate delay in receiving answers by signing your ad. only with initials (your own or others), care of your home, your office or a post-office box number in your city.

### POSITIONS VACANT

**HIGH-GRADE** master mechanic wanted for street railway system in Texas city of 25,000. P-342, Elec. Ry. Journal.

### POSITIONS VACANT

**ARMATURE** winder for street railway work wanted (married preferred), must be steady and first-class workman. Steady employment for the right man. State salary in first letter. Sioux City Service Company, Sioux City, Iowa.

### POSITIONS WANTED

**POSITION** by man experienced in armature winding, controller repairing and car wiring with good chance for advancement. Western states preferred. PW-376, Elec. Ry. Journal, Philadelphia.

## Your Advancement

is largely in your own hands—it is doubtful if any one else is worrying over it.

Better positions are constantly being secured through small advertisements in the "Positions Wanted" columns.

**LIVE**, energetic young man wanted to act as shop foreman of small suburban system in Northern Alabama. Excellent opportunity for advancement to right party. State fully experience and salary expected. P-372, Elec. Ry. Journal, Leader-News Bldg., Cleveland.

**ENGINEER** and executive; technical; 15 years electric railway experience; designs, construction, maintenance of way, investigations, reports, extensive valuations, large utilities. In responsible charge, desires change; age, 37; best references. PW-373, Elec. Ry. Journal, Chicago.

**MAN** wanted, experienced in electric railway track work, as shop inspector for frog and switch manufacturer; also draftsman who has had experience in designing manganese special track work. State salary and experience in first letter. P-361, Elec. Ry. Journal, Chicago.

**OVERHEAD** man with 17 years' experience on construction and maintenance of City and Interurban lines, wishes position as superintendent or general foreman. Successful in organizing and handling men. PW-364, Elec. Ry. Journal, Philadelphia.

**NAMES** and addresses wanted of competent English-Spanish translators in various localities east of Chicago who can work part time. P-369, Elec. Ry. Journal.

**AN** energetic, sober, ambitious 38 year old man, 16 years' experience in street railway transportation with large company. Thoroughly familiar with every detail of the department, including making traffic surveys, making and adjusting schedules and employing, training and handling men, desires position as transportation superintendent. Present employer as reference. PW-377, Elec. Ry. Journal, Leader-News Bldg., Cleveland.

### POSITIONS WANTED

**CHIEF** engineer or engineer maintenance of way, 12 years' experience maintenance, construction and operation. Accurate knowledge of all matters related to way and structure department. Technically trained. References. PW-367, Elec. Ry. Journal, Chicago.

### FOR SALE

**Fare Registers For Sale**  
20 R-5 International fare registers, A-1 condition. Address C. S. B. & N. I. Ry. Co., South Bend, Ind. Chicago.

**60 CENTS  
FOR 20 WORDS**





## WANTED

4—Model D Johnson Registering Fare Boxes, with Paper Ticket Attachments, Keystone Mounting.

2—K-36-J Controllers.

JACKSON RAILWAY & LIGHT CO.  
Jackson, Tennessee

## 1000 TONS

NEW 7 in. HIGH  
TEE RAIL

Bethlehem Steel Co. P. S. Co.  
Section 91-282. Same as L. S.  
Co's Section 91-375.

*For immediate delivery. Reasonable price. Will sell any quantity up to 1000 tons.*

Apply F. S. 369, Electric Railway Journal  
10th Ave. at 36th St., New York City

## STREET CARS

4 ft. 8½ in. gage

3—32 ft. Closed

Complete with equipment. First-Class  
Will convert to one-man type

4-9 Bench Open Trailers

Immediate Shipment

## ZELNICKER IN ST. LOUIS

Get Bulletin 250-88 pages  
Circulation, One Quarter Million  
Railway Power Plant & Industrial Equip.

**Cars, Rails, Locomotives,  
Cranes, Generators, Turbines,  
Motors, Machine Tools,  
Hammers, Presses**

Everything For  
POWER, RAILROADS, INDUSTRY,  
CONTRACTORS

What do you want to Buy or Sell?  
Write for our Bulletin No. 110.

Our **ENGINEERING DEPARTMENT** will  
Design, Construct and Finance your  
undertakings. Send us particulars.

**RAILWAY & POWER EQUIPMENT CO.**

Woolworth Bldg., New York, N. Y.  
Cable Address: "Johnscar" Code, Western  
Union.

## FOR SALE

## 4 Wason Paye Cars

28 ft. over corner posts

Standard O-36 Trucks

2 Gen. Elec. No. 87—60 hp.

Motors K-36 Control

*Splendid Condition*

**ELECTRIC EQUIPMENT CO.**  
Commonwealth Bldg., Philadelphia, Pa.

SALE OF  
MACHINE TOOLS

Sealed bids will be received until

11 A.M., April 21, 1919

at the office of District Manager of Finance,  
Air Service, Keenan Bldg., Pittsburgh, Pa.,  
or at Material Disposal Section, Finance  
Division, Air Service, Washington, D. C.,  
for any or all of the following machine  
tools:

8 Boring Mills, 1 Broaching Machine, 28  
Drill Presses (Multiple Spindle, Radial,  
etc.), 1 Gear Shaper, 95 Grinders, 1 Key-  
seater, 192 Lathes (Engine, Turret, etc.),  
1 Measuring Machine, 218 Milling Ma-  
chines (Vertical and Horizontal, Plain and  
Universal), 1 Planer, 10 Power Saws, 1—  
30 ton Press (Forcing), 21 Screw Ma-  
chines, 2 Threading Machines, 17 Thread  
Millers, etc., etc.

This equipment may be seen at the plant  
of the Union Switch and Signal Co., Swiss-  
vale, Pa. Full particulars may be had on  
inquiry of Material Disposal Officer at 810  
Little Bldg., Boston; 2050 Elmwood Ave.,  
Buffalo; 1216 Consumers Bldg., Chicago;  
Mutual Home Bldg., Dayton; 1550 Wood-  
ward Bldg., Detroit; 360 Madison Ave.,  
New York; Keenan Bldg., Pittsburgh, or  
504 Postal Tel. Bldg., San Francisco.

FOR SALE  
CARS

2—McKean Gaso-Electric Cars.  
12—Differential 20-yd. Cars.  
5—Gasoline Passenger Cars.  
50—Freight Cars.  
12—Electric Bets.

Get our Lists and Prices

J. F. DONAHOO CO. Birmingham, Ala.

## FOR SALE

1 Double Track

IRON  
BRIDGE

290 ft. long, 23 ft. wide, inside  
trusses.

Good as new.

Can be removed immediately.

R. C. HOFFMAN & CO., Inc.  
Baltimore, Md.

## RAILS

15,000 TONS—NEW and RELAYERS  
NEW—12 lb., 16 lb., 20 lb., 25 lb., 30 lb.,  
40 lb., 60 lb., 70 lb., 75 lb., 80 lb., 84  
lb., 90 lb.

RELAYERS—30 lb., 35 lb., 40 lb., 45 lb.,  
55 lb., 60 lb., 70 lb., 80 lb., 85 lb., 90  
lb., 100 lb.

Fas rings, New Bolts, Nuts and Spikes.  
New Frogs, Switches, Crossings and all  
acc series. Carload and less carload in-  
quiries and orders a specialty. Rails cut  
to lengths for structural purposes. At-  
tractive prices. Immediate shipments from  
stock.

L. B. FOSTER COMPANY  
Park Bldg., Pittsburgh, Pa.

Armature  
Coil Taping  
Machine

Saves Time,  
Labor and Money

A boy can tape 40  
coils for Westing-  
house 12A Arma-  
ture in an hour.  
Further particulars  
gladly furnished.

Geo. M. Griswold Machine Co.  
New Haven, Conn.

## CLEVELAND NATURAL WORKS

Incorporated  
Cleveland, Ohio

Everything in the Line  
of Repairs to Electrical  
Machinery

Complete Armatures, New Armatures,  
Rewound Armature Cores, Armature  
Shafts, Armature Coils, Fields and  
Commutators.

Established 23 Years

*There is a  
Searchlight Section  
in each of  
the following papers:*

- [1] American Machinist
- [2] Coal Age
- [3] Electrical World
- [4] Electrical Merchandising
- [5] Electric Railway Journal
- [6] Engineering and Mining Journal
- [7] Engineering News-Record
- [8] Chemical and Metallurgical Engineering
- [9] Power

Each of these 9 papers  
is the leading periodical  
of the industry it serves.

Searchlight advertise-  
ments will get you in touch  
with the important men of  
these important industries.





## Boiler Bargains

Extraordinary opportunity. Good boilers at the right price. Have been used 6 months to 3 years but all in excellent condition.

Sterlings 253 H. P.  
352 H. P.

Edgemoors 600 H. P.  
813 H. P.

Sterlings 512 H. P.

We are prepared to supply complete boiler plants including pumps, piping, breaching, stacks, etc.

Tell us what you need and get our quotations. All goods ready for *immediate delivery* subject to prior sale.

Note:—We are compiling an extensive list of machinery, electrical apparatus, mechanical supplies, tools and structural material of all kinds which we have for sale. If you desire to receive this list, when printed, please file with us your name and address.

## Du Pont Chemical Company

Incorporated

Sales Department

Wilmington, Delaware

### FOR SALE

#### Complete Electric Railway System

- 3—practically new trolley cars equipped with four GE 217 motors complete with GE air compressors, mounted on No. 27 M.C.B. Brill Trucks. Standard gauge.
- 1—General Electric direct current 720 R.P.M., 1200 volt, 167 amp. Railway type Generator for belt drive. Complete with switchboard containing all instruments including circuit breaker.
- 1—450 H.P. Fleming Harrisburg double eccentric non-releasing Corliss Valve Engine, complete with spare parts. Arranged for belt drive with sufficient length of shaft for direct connected generator. Good as new.
- Approximately 4000 cypress cross ties. Good condition.
- 700—Creosoted Poles about 10 in. x 8 in. x 30 ft.
- 70,000 ft. No. 0600 copper trolley wire. Good as new.
- 2—250 H.P. Scotch Marine Boilers, built for 150 lb. working pressure, complete with stack. Equipped with shaking grates and extra oil burning furnaces.

A. MARX & SONS, New Orleans, La.

### ROTARY CONVERTERS

- 1—300-kw. Westinghouse Rotary Converter, 3-ph., 60-cy., 370-v. A.C., 575-v. D.C., 600 r.p.m.
- 1—200-kw. Westinghouse Rotary Converter, 3-ph., 60-cy., 370-v. A.C., 575-v. D.C.
- 1—150-kw. Westinghouse Rotary Converter, 2 or 3-ph., 60-cy., 250-v. D.C., 720 r.p.m.

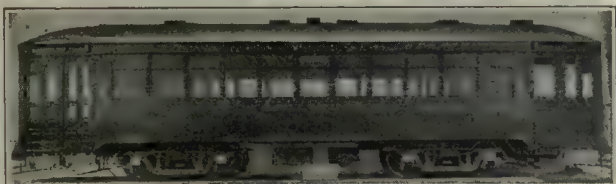
### TURBINE

- 1—500-kw. Westg. Horizontal, 3-ph., 60-cy., 370-v. (can be rewound for any standard voltage), 3600 r.p.m., with or without condensing equipment.

#### ARCHER & BALDWIN, INC.

114-118 Liberty St., New York, N. Y.

Telephone 4337-4338 Rector



### IMMEDIATE DELIVERY

Five new P.A.Y.E. double truck cars. Length, 45-ft. Equipped with 4GE Co.'s 247 Motors and G. E. Co. Air Brakes.

McGUIRE-CUMMINGS MANUFACTURING CO.

Cars and Trucks, Snow Sweepers, Electric Locomotives  
111 West Monroe Street, Chicago, Ill.

### SURFACE CONDENSERS

- 1—8000-sq.ft. Alberger.
- 1—6000-sq.ft. Wheeler Cond. & Eng'g Co.
- 3—4000-sq.ft. Wheeler Cond. & Eng'g Co.
- 1—2900-sq.ft. Willans-Robinson.
- 1—2800-sq.ft. Wheeler Cond. & Eng'g Co.
- 1—1380-sq.ft. Worthington.
- 1—1200-sq.ft. C. H. Wheeler.
- 1—1150-sq.ft. Wheeler Cond. & Eng'g Co.
- 1—700-sq.ft. Wheeler Cond. & Eng'g Co.
- 1—525-sq.ft. Frick.

#### MacGovern & Company, Inc.

114 Liberty Street, New York, N. Y.

Pittsburgh Office, 498 Union Arcade Building



# WHAT AND WHERE TO BUY

Equipment, Apparatus and Supplies Used by the Electric Railway Industry with  
Names of Manufacturers and Distributors Advertising in this Issue

Advertising, Street Car.  
Collier, Inc., Barron G.

Air Rectifiers.  
Holden & White, Inc.

Anchors, Guy.  
Electric Service Supplies Co.  
Holden & White, Inc.  
Johns-Manville Co., H. W.  
Ohio Brass Co.  
Westinghouse Elec. & M. Co.

Automobiles and Buses.  
Brill Co., The J. G.

Axle Straighteners.  
Columbia M. W. & M. I. Co.

Axles.  
Bemis Car Truck Co.  
Brill Co., The J. G.  
Cambria Steel Co.  
Carnegie Steel Co.  
General Steel Co.  
Midvale Steel & Ordnance Co.  
National Railway Appliance Co.  
St. Louis Car Co.  
Standard Steel Works Co.  
Taylor Electric Truck Co.  
Westinghouse Elec. & M. Co.

Rabbiting Devices.  
Columbia M. W. & M. I. Co.

Badges and Buttons.  
American Railway Supply Co.  
Electric Service Supplies Co.  
International Register Co., The

Bankers and Brokers.  
Coal & Iron National Bank.

Batteries, Dry.  
Johns-Manville Co., H. W.  
Nichols-Lintern Co.

Batteries, Storage.  
Electric Storage Battery Co.

Bearings and Bearing Metals.  
Ajax Metal Co.  
Bemis Car Truck Co.  
Columbia M. W. & M. I. Co.  
Eureka Co.  
General Electric Co.  
Kerschner Co., Inc., W. R.  
More-Jones Brass & M. Co.  
St. Louis Car Co.  
Taylor Elec. Truck Co.  
Westinghouse Elec. & M. Co.

Bearings, Center and Roller Side.  
Holden & White, Inc.

Bearings, Oil-less, Graphite, Bronze and Wood.  
Bound Brook Oil-less Bearing Co.

Bearings, Roller and Ball.  
Gurney Ball Bearing Co.

Bells and Gongs.  
Brill Co., The J. G.  
Columbia M. W. & M. I. Co.  
Electric Service Supplies Co.  
St. Louis Car Co.

Benders, Rail.  
Niles-Bement-Pond Co.  
Watson-Stillman Co.  
Western Electric Co.  
Zelnicker Supply Company, Inc.,  
Walter A.

Blasting Powder and Equipment.  
Du Pont de Nemours & Co., E. I.

Boiler Cleaning Compounds.  
Johns-Manville Co., H. W.

Boiler Coverings.  
Johns-Manville Co., H. W.

Boiler Tubes.  
National Tube Co.

Boilers.  
Babcock & Wilcox Co.

Bond Testers.  
American Steel & Wire Co.  
Lincoln Bonding Co.

Bonding Apparatus.  
Electric Railway Improvement Co.  
Lincoln Bonding Co.  
Ohio Brass Co.

Bonding Tools.  
American Steel & Wire Co.  
Electric Service Supplies Co.  
Ohio Brass Co.

Bonds, Rail.  
American Steel & Wire Co.  
Electric Railway Improvement Co.  
Electric Service Supplies Co.  
General Electric Co.  
Johns-Manville Co., H. W.  
Lincoln Bonding Co.  
Ohio Brass Co.  
Westinghouse Elec. & M. Co.

Boring Tools, Car Wheel.  
Niles-Bement-Pond Co.

Brackets and Cross Arms. (See also Poles, Ties, Posts, Piling and Lumber.)

American Bridge Co.  
Bates Expanded Steel Truss Co.  
Creaghead Engrg. Co.  
Electric Railway Equipment Co.  
Electric Service Supplies Co.  
Hubbard & Co.  
Lindsley Bros. Co.  
Ohio Brass Co.

Brake Adjusters.  
Holden & White, Inc.  
Westinghouse Trac. Brake Co.

Brake Shoes.  
American Brake S. & Fdy. Co.  
Barbour-Stockwell Co.  
Bemis Car Truck Co.  
Brill Co., The J. G.  
Columbia M. W. & M. I. Co.  
St. Louis Car Co.  
Taylor Elec. Truck Co.  
Wheel Truing Brakeshoe Co.

Brakes, Brake Systems and Brake Parts.

Ackley Brake & Supply Corp.  
Allis-Chalmers Mfg. Co.  
Bemis Car Truck Co.  
Brill Co., The J. G.  
Columbia M. W. & M. I. Co.  
General Electric Co.  
Holden & White, Inc.  
National Brake Co.  
St. Louis Car Co.  
Safety Car Devices Co.  
Taylor Elec. Truck Co.  
Westinghouse Trac. Brake Co.

Bridges and Buildings.  
American Bridge Co.  
Brooms, Track, Steel or Rattan.  
Zelnicker Supply Company, Inc.,  
Walter A.

Brushes, Carbon.  
General Electric Co.  
Jeandron, W. J.  
Morgan Crucible Co.  
National Carbon Co., Inc.  
United States Graphite Co.  
Western Electric Co.  
Westinghouse Elec. & M. Co.

Brushes.  
Whiting-Adams Co.  
Brushes, Graphite.  
United States Graphite Co.

Brush Holders.  
Anderson Mfg. Co., A. & J. M.  
Eureka Co.

Buckets.  
Blaw-Knox Co.

Bunkers, Coal.  
American Bridge Co.

Bushings, Case-Hardened Manganese.  
Bemis Car Truck Co.

Bushings, Graphite and Wooden.  
Bound Brook Oil-less Bearing Co.

Cars, Dump.  
Differential Car Co.

Car Equipment. (For Fenders, Heaters, Registers, Wheels, etc., see those Headings.)

Car Trimmings. (For Curtains, Doors, Seats, etc., see those Headings.)

Cars, Passenger, Freight, Express, etc.  
American Car Co.  
Brill Co., The J. G.  
Cambria Steel Co.  
Kuhlman Car Co., G. C.  
McGuire-Cummings Mfg. Co.  
Midvale Steel & Ordnance Co.  
Thomas Perley A.  
St. Louis Car Co.  
Watson Mfg. Co.

Cars, Second Hand.  
Electric Equipment Co.

Cars, Self-Propelled.  
Electric Storage Battery Co.  
General Electric Co.

Castings, Brass, Composition or Copper.  
Anderson M. Co., A. & J. M.  
Columbia M. W. & M. I. Co.  
Eureka Co.  
More-Jones Brass & M. Co.

Castings, Gray Iron and Steel.  
American B. S. & Fdy. Co.  
American Bridge Co.  
Bemis Car Truck Co.  
Columbia M. W. & M. I. Co.  
St. Louis Car Co.  
Standard Steel Works Co.

Castings, Malleable and Brass.  
American Brake S. & Fdy. Co.  
Bemis Car Truck Co.  
Columbia M. W. & M. I. Co.  
St. Louis Car Co.

Catchers and Retrievers, Trolley.  
Electric Service Supplies Co.  
Holden & White, Inc.  
Ohio Brass Co.  
Trolley Supply Co.  
Wood Co., C. N.

Checks, Employees.  
American Railway Supply Co.

Circuit Breakers.  
Cutter Co., The.  
General Electric Co.  
Westinghouse Elec. & M. Co.

Clamps and Connectors, for Wires and Cables.  
Anderson Mfg. Co., A. & J. M.  
Electric Railway Equipment Co.  
Electric Service Supplies Co.  
General Electric Co.  
Hubbard & Co.  
Ohio Brass Co.  
Westinghouse Elec. & M. Co.

Cleaners & Scrapers, Track. (See also Snow-Plows, Sweepers and Brooms.)  
Brill Co., The J. G.  
Ohio Brass Co.  
Western Electric Co.

Clusters & Sockets.  
General Electric Co.

Coal and Ash Handling. (See Conveying and Hoisting Machinery.)

Coil Banding and Winding Machines.  
Columbia M. W. & M. I. Co.  
Electric Service Supplies Co.

Colls, Armature and Field.  
Cleveland Armature Works  
Columbia M. W. & M. I. Co.  
D & W Fuse Co.  
General Electric Co.  
Independent Lamp & Wire Co.  
King-Coil Mfg. Co.  
Westinghouse Elec. & Mfg. Co.

Colls, Choke & Kicking.  
Electric Service Supplies Co.  
General Electric Co.  
Westinghouse Elec. & M. Co.

Coin-Counting Machines.  
Electric Service Supplies Co.  
International Register Co.

Commutator Slotters.  
Electric Service Supplies Co.  
General Electric Co.  
Westinghouse Elec. & M. Co.  
Wood Co., C. N.

Commutator Truing Devices.  
General Electric Co.

Commutators or Parts.  
Cameron Elec'l Mfg. Co.  
Cleveland Armature Works.  
Columbia M. W. & M. I. Co.  
Eureka Co.  
General Electric Co.  
King-Coil Mfg. Co.  
Westinghouse Elec. & M. Co.

Compressors, Air.  
Allis-Chalmers Mfg. Co.  
General Electric Co.  
Westinghouse Traction Brake Co.

Concrete Mixers.  
Blaw-Knox Co.

Condensers.  
Allis-Chalmers Mfg. Co.  
General Electric Co.  
Westinghouse Elec. & M. Co.

Conduits, Underground.  
Johns-Manville Co., H. W.  
Standard Underground Cable Co.

Connectors, Solderless.  
Westinghouse Elec. & Mfg. Co.

Construction, Industrial.  
Thompson-Starrett Co., The

Controller Regulators.  
Electric Service Supplies Co.

Controllers or Parts.  
Allis-Chalmers Mfg. Co.  
Columbia M. W. & M. I. Co.  
General Electric Co.  
Johns-Manville Co., H. W.  
Triggerlock Reversible Controller  
Finger  
Westinghouse Elec. & M. Co.

Controlling Systems.  
General Electric Co.  
Westinghouse Elec. & M. Co.

Converters, Rotary.  
Allis-Chalmers Mfg. Co.  
General Electric Co.  
Westinghouse Elec. & M. Co.

Conveying and Hoisting Machinery.  
American Bridge Co.  
Columbia M. W. & M. I. Co.  
Green Eng'g Co.

Cord, Bell, Trolley, Register, Etc.  
Brill Co., The J. G.  
Electric Service Supplies Co.  
International Register Co., The  
Roebeling's Sons Co., John A.  
Samson Cordage Works.  
Trolley Supply Co.

Cord Connectors and Couplers.  
Electric Service Supplies Co.  
Samson Cordage Works.  
Wood Co., C. N.

Couplers, Car.  
Brill Co., The J. G.  
Ohio Brass Co.  
Van Dorn Coupler Co.  
Westinghouse Trac. Brake Co.

Cranes. (See also Hoists.)  
Allis-Chalmers Mfg. Co.  
Niles-Bement-Pond Co.  
Toledo Bridge & Crane Co., The

Cresosoting. (See Wood Preservatives.)

Cross Arms. (See Brackets.)

Crossing Foundations.  
International Steel Tie Co.

Crossing Signals. (See Signals, Crossing.)

Crossings, Track. (See Track, Special Work.)

Crushers, Rock.  
Allis-Chalmers Mfg. Co.

Culverts.  
Canton Culvert & Silo Co.  
Stark Rolling Mill Co.

Cutting Apparatus, Oxy-Acetylene.  
Milburn Co., The Alex

Curtains and Curtain Fixtures.  
Brill Co., The J. G.  
Electric Service Supplies Co.  
St. Louis Car Co.

Dealers' Machinery.  
Archer & Baldwin  
Cleveland Armature Wks.  
Electric Equipment Co.  
Foster Co., L. B.  
Griswold Machine Co., Geo. M.  
Hyman Michaels Co.  
MacGovern & Co., Inc.  
Zelnicker Supply Co., W. A.

Derailing Devices.  
Cleveland Frog & Crossing Co.

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Columbia M. W. & M. I. Co.  
Creaghead Engrg. Co.  
Electric Service Supplies Co.

Detective Service.  
Wish Service F. Edward

Die Blocks.  
General Steel Co.

Dogs, Lathe.  
Williams & Co., J. H.

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Consolidated Car Heating Co.  
National Pneumatic Co., Inc.  
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Johns-Manville Co., H. W.

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Brill Co., The J. G.  
Hale & Kilburn Corp.

Doors, Folding Vestibule.  
National Pneumatic Co., Inc.

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Holst, Engelhardt W.  
Republic Engineers Inc.  
Richey, Albert S.  
Sanderson & Porter  
Sargent & Lundy  
Scoville Engineering Co.  
Stone & Webster  
Wells, Gardiner F.  
White Companies, The J. G.  
Woodmansee & Davidson Engineering Co.

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Westinghouse Elec. & M. Co.

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Cleveland Fare Box Co.  
International Register Co., The  
National Railway Appliance Co.  
Ohmer Fare Register Co.

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American Steel & Wire Co.  
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Wood Co., Charles N.

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Johns-Manville Co., H. W.

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Standard Steel Works Co.

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D & W Fuse Co.  
General Electric Co.  
Johns-Manville Co., H. W.  
Westinghouse Elec. & M. Co.  
Williams & Co., J. H.

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Economy Fuse & Mfg. Co.  
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Westinghouse Trac. Brake Co.

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General Electric Co.

**Gas Producers.**

Westinghouse Elec. & M. Co.

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Westinghouse Elec. M. Co.

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Bemis Car Truck Co.  
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Electric Service Supplies Co.  
General Electric Co.  
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Nuttall Co., E. D.

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Graphite.

Morgan Crucible Co.

**Grates, Chain.**

Green Eng'g Co.

**Greases. (See Lubricants.)**

Grinding Blocks & Wheels.

Railway Track-work Co.

**Grinders and Grinding Supplies.**

Indianapolis Switch & Frog Co.  
Metal & Thermit Corp.  
Railway Track-work Co.

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American Bridge Co.

**Guards, Trolley.**

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Ohio Brass Co.

**Harps, Trolley.**

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Electric Service Supplies Co.  
Hensley Trolley & Mfg. Co.  
Holland Trolley Supply Co.  
More-Jones Brass & M. Co.  
Nuttall Co., R. D.  
Star Brass Works

**Headlights.**

Crouse-Hinds Co.  
Electric Service Supplies Co.  
General Electric Co.  
Ohio Brass Co.  
St. Louis Car Co.  
Trolley Supply Co.

**Heaters, Car, Electric.**

Consolidated Car Heating Co.  
Gold Car Heating & Lighting Co.  
Holden & White, Inc.  
Smith Heater Co., Peter

**Heaters, Car, Hot Air and Water.**

Cooper Heater Co.  
Holden & White, Inc.  
Smith Heater Co., Peter

**Heaters, Car, Stove.**

Electric Service Supplies Co.  
Holden & White, Inc.  
Smith Heater Co., Peter

**Hoists and Lifts.**

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Ford Chain Block & Mfg. Co.  
Niles-Bement-Pond Co.  
Toledo Bridge & Crane Co., The  
Yale & Towne Mfg. Co.

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Williams & Co., J. H.

**Hose Bridges**

Ohio Brass Co.

**Hose, Pneumatic & Fire.**

Johns-Manville Co., H. W.

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Niles-Bement-Pond Co.  
Watson-Stillman Co.

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Elec'l Testing Laboratories

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General Electric Co.  
Western Electric Co.  
Westinghouse Elec. & M. Co.  
Weston Elec'l Instrument Co.

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General Electric Co.  
Hope Webbing Co.  
Irvington Varnish & Insulator Co.  
Johns-Manville Co., H. W.  
Mitchell-Rand Mfg. Co.  
Okonite Co.  
Standard Paint Co.  
Standard Underground Cable Co.  
Standard Woven Fabric Co.  
U. S. Rubber Co.  
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Mitchell-Rand Mfg. Co.  
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Creshead Engrg. Co.  
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Buckeye Jack Mfg. Co.  
Columbia M. W. & I. Co.  
National Ry. Appliance Co., Ltd.  
Templeton, Kenly & Co., Ltd.  
Watson-Stillman Co.

**Joints, Rail.**

Carnegie Steel Co.  
Zelnicker Supply Co., Inc., W. A.

**Journal Boxes.**

Bemis Car Truck Co.  
Brill Co., The J. G.

**Junction Boxes.**

Johns-Manville Co., H. W.  
Standard Underground Cable Co.

**Laboratories.**

Elec'l Testing Laboratories

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General Electric Co.  
Westinghouse Elec. & M. Co.

**Lamps, Arc and Incandescent.**

Anderson M. Co., A. & J. M.  
General Electric Co.  
Westinghouse Elec. & M. Co.

**Lamps, Signal and Marker.**

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Ohio Brass Co.

**Lathes, Attachments.**

Williams & Co., J. H.

**Lathes, Car Wheel.**

Niles-Bement-Pond Co.

**Lighting Regulators, Car.**

Holden & White, Inc.

**Lightning Protection.**

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Electric Service Supplies Co.  
General Electric Co.  
Ohio Brass Co.  
Westinghouse Elec. & M. Co.

**Lights, Portable Carbide**

Millburn Co., The, Alex

**Line Material. (See also Brackets.**

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Archbold-Brady Co.  
Columbia M. W. & M. I. Co.  
Creshead Engrg. Co.  
Dick, Kerr & Co.  
Drew Elec. & Mfg. Co.  
Electric Railway Equipment Co.  
Electric Service Supplies Co.  
Eureka Co.  
General Electric Co.  
Holden & White, Inc.  
Hubbard & Co.  
Johns-Manville Co., H. W.  
Macallen Co.  
More-Jones Brass & M. Co.  
Ohio Brass Co.  
Westinghouse Elec. & M. Co.

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General Electric Co.  
McGuire-Cummings Mfg. Co.  
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Galena-Signal Oil Co.

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Watson-Stillman Co.

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Bemis Car Truck Co.

**Mats.**

Johns-Manville Co., H. W.

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Dick, Kerr & Co.  
General Electric Co.  
Westinghouse Elec. & M. Co.

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Barbour-Stockwell Co.  
Bemis Car Truck Co.  
Columbia M. W. & M. I. Co.  
Hubbard & Co.

**Oil Storage Systems.**

Gilbert & Barber Mfg. Co.

**Oils. (See Lubricants.)****Overhead Equipment. (See Line Material.)****Oxy-Acetylene. (See Cutting Apparatus, Oxy-Acetylene.)****Packing.**

Johns-Manville Co., H. W.  
Power Specialty Co.  
U. S. Rubber Co.  
Westinghouse Trac. Brake Co.

**Packing Rings.**

Johns-Manville Co., H. W.

**Paints and Varnishes. (Insulating.)**

Holden & White, Inc.  
Irvington Varnish & Insulator Co.  
Johns-Manville Co., H. W.  
Mitchell-Rand Mfg. Co.  
Standard Paint Co.

**Paints and Varnishes. (Preservative.)**

Johns-Manville Co., H. W.  
Standard Paint Co.

**Paints and Varnishes for Woodwork.**

National Railway Appliance Co.

**Paving Bricks, Filter and Stretches**

Nelsonville Brick Co.

**Paving Material.**

American B. S. & Fdry. Co.  
Nelsonville Brick Co.

**Pickups. (Trolley Wire.)**

Electric Service Supplies Co.  
Ohio Brass Co.

**Pinion Pullers.**

Columbia M. W. & M. I. Co.  
Electric Service Supplies Co.  
General Electric Co.  
Wood Co., C. N.

**Pinions. (See Gears.)****Pins, Case Hardened, Wood and Iron.**

Bemis Car Truck Co.  
Electric Service Supplies Co.  
Ohio Brass Co.  
Westinghouse Trac. Brake Co.

**Pipe.**

National Tube Co.

**Pipe Fittings.**

Power Specialty Co.  
Standard Steel Works Co.  
Watson-Stillman Co.  
Westinghouse Trac. Brake Co.

**Pliers, Insulated.**

Electric Service Supplies Co.  
National Railway Appliance Co.

**Pneumatic Hose.**

Westinghouse Trac. Brake Co.

**Poles, Metal Street.**

Bates Expanded Steel Truss Co.  
Electric Railway Equipment Co.  
Hubbard & Co.  
National Railway Appliance Co.

**Pole Sleeves.**

Drew Elec. & Mfg. Co.

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Carney & Co., B. J.  
Lindsay Bros. Co.  
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Southern Cypress Mfg.'s Assn.  
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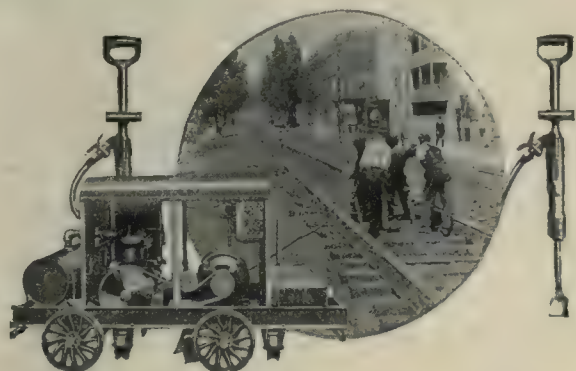


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The air furnished by the compressor car may  
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Wood Co., C. N.

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justers.)  
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Nichols-Lintern Co.  
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Tired.)

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D & W  
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Candler Building

220 West 42nd Street, New York City



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**The "Nycap=Exide" Battery**  
for  
**STORAGE BATTERY STREET CARS**  
**THE ELECTRIC STORAGE BATTERY CO**  
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are made for every condition and requirement. M. C. B. Pin and Link, Car and Air, in all sizes and types.

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for Monitor and Arch Roof Cars, and all classes of buildings;  
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of Car Temperatures.  
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**Eight Hundred and Twenty-three Equipments of N L Indicating Tail-lights Sold During the Year 1918**

2323 Cars now equipped and the motormen in Cleveland, Toledo, Philadelphia, Akron and St. Joseph say it is the best thing ever put on a car to promote safety and economy.

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## *Ball Bearings for the IDEAL Car*

Designed, as it was, for the utmost in efficiency and economy, the choice of *every* item on the Light-Weight Safety Car is of more than usual significance. That is why

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Gurney research, Gurney design, and Gurney construction have provided a bearing that has become as natural a part of electric railway cars as a car wheel or trolley pole.

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For Any Kind of Electric Car.*

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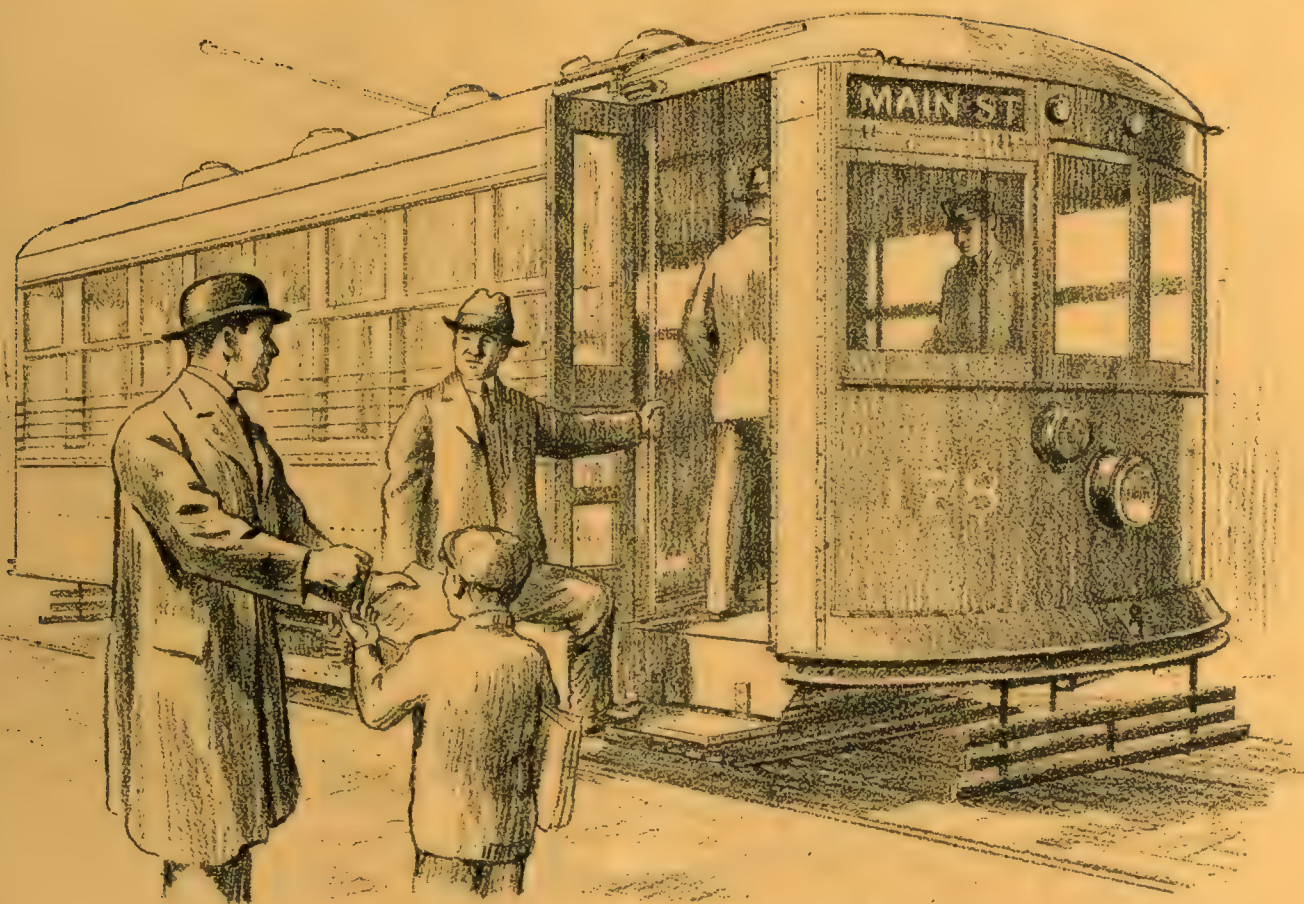
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"Come, Bill, no step hopping with these Birney Safety Cars. They can't start till the door's closed."

"That's right. Safety isn't optional any longer."

**N**O starting or stopping a Birney Safety Car while the door is open or the step is down. So, no matter whether the motorman and the passenger may be willing to take a chance, the car won't permit it.

This arrangement not only protects the passengers, but it relieves the motorman of special watchfulness lest he open or close the door at the wrong time.

Also it protects the company against unjust claims for damages.

The Birney Safety Car furnishes complete

protection to the public, the car men and the company.

A combination of safety devices operates simultaneously and instantly, in case of emergency, by one motion of the motorman's hand.

Ungrasping the controller handle cuts off the power, applies the brakes, sands the track, opens the front door, lowers the step and unlatches the rear door.

Safety isn't dependent on the motorman's alertness and skill.

The car has lived up to its name.

*For complete information on the Birney Safety Car apply to*

THE J. G. BRILL COMPANY  
PHILADELPHIA, PA.

G. C. KUHLMAN CAR CO.  
CLEVELAND, OHIO



AMERICAN CAR COMPANY  
ST. LOUIS, MO.

WASON MANUFACTURING CO.  
SPRINGFIELD, MASS.



# HAVE YOU READ

What the Chicago, Milwaukee & St. Paul Railway says about the General Electric 3000-volt d.c. locomotives that haul its star passenger trains, the "Olympian" and the "Columbian", over the Continental Divide?

Here are a few of the advertisements that the progressive "St. Paul" has placed in thousands of newspapers and other publications throughout the United States.

The obvious stimulus to passenger traffic is only one of the significant results of this project, which is the greatest electrification in the world.



# GENERAL ELECTRIC COMPANY



# ELECTRIC RAILWAY JOURNAL



**AGASOTE**

ROOFING, HEADLINING AND WAINSCOTING  
MAKE LIGHT WEIGHT SAFETY CAR CONSTRUCTION PROFITABLE

**PANTASOTE**

THE MOST ECONOMICAL CURTAIN MATERIAL KNOWN

THE PANTASOTE COMPANY NEW YORK CHICAGO SAN FRANCISCO



# Westinghouse

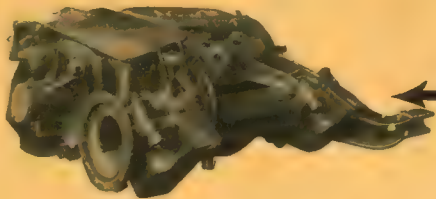
## Railway Equipment For Modern Low Floor Cars



40 HORSE POWER

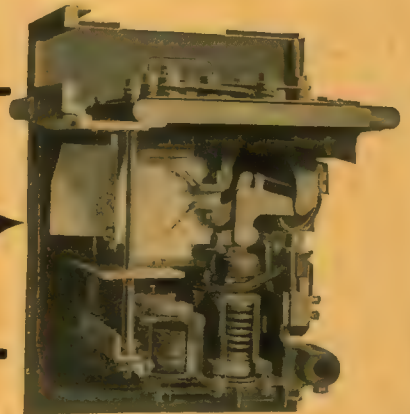
**No. 514 Motor**

**Type HL Control**



50 HORSE POWER

**No. 532 Motor**

LIGHT WEIGHT  
REQUIRES SMALL SPACE

Westinghouse Motors which fit any service, where low-floor, 26 inch wheel cars are used. They have proved reliable and successful in Cleveland, Pittsburgh, Toledo and other large cities and

H L Unit-Switch Central which has not only proved successful everywhere, but is the one control that covers the very requirements of modern city cars on which the most recent safety devices are employed.



Westinghouse Electric & Manufacturing Co.  
East Pittsburgh, Pa.





# Electric Railway Journal

H. W. BLAKE, *Editor*

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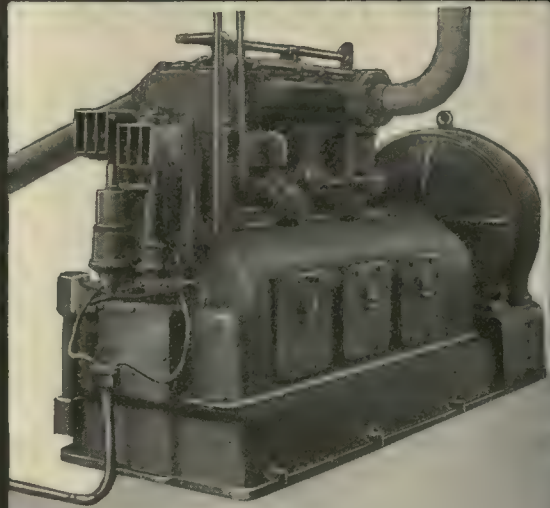
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Circulation of this issue, 6800 copies



## Air Compressors for Shop Uses



Westinghouse Motor-Driven Air  
Compressor with automatic gov-  
ernor. All sizes up to 550 cu. ft.  
Catalog No. 401.

Compressed Air is a convenient, cleanly  
agent always on tap for railway shop uses.

## Westinghouse Electrically-Driven Compressors

are especially adapted to bench and machine  
use for supplying pressure to blow chips and  
cuttings; also for pneumatic tools and hoists.

## Westinghouse Traction Brake Company

General Offices and Works, Wilmerding, Pa.

Atlanta, Ga.  
Boston, Mass.  
Chicago, Ill.  
Columbus, O.

Denver, Col.  
Houston, Tex.  
Los Angeles, Cal.



Mexico City  
New York, N. Y.  
Pittsburgh, Pa.

San Francisco.  
Seattle, Wash.  
St. Louis, Mo.  
St. Paul, Minn.



# Westinghouse Bus Supports

Pillar-Insulator, Front-Connected Type For Heavy Duty  
A Complete Line, 7,500 to 66,000 Volts.

## Reliability

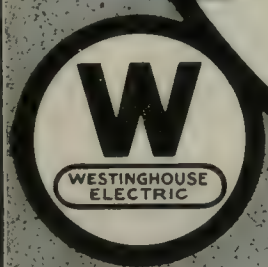
—proved by their excellent operation under the most severe conditions encountered in the largest generating stations.

## Flexibility

—Any of the mounting fittings, or any of the bus-holding units, can be used with any voltage heavy-duty porcelain unit, a very desirable feature, permitting inexpensive and easy adaptation to different bus and voltage requirements at any future date.

## Adjustability

—Design makes ample provision for adjustability, being adjustable 360° in the horizontal plane, and approximately 1/2-in. in the vertical plane.



Westinghouse Electric & Manufacturing Co.  
East Pittsburgh, Pa.

# Westinghouse





## The Safety Car Is Popular

Too often the electric railway manager who is asked to consider the Safety Car worries unduly about the self-imposed query: "What will the people say?"

What do the people say?

They say, as expressed by *riding* rather than *talk*, that for business travel they would rather use the Safety Car than their own automobiles; that they would rather ride home for lunch than stay downtown; that a snappy Safety Car every 10 minutes means that they *ride* while a sluggish two-man car every 15 or 20 minutes means that they *walk*.

Use Safety Car Control Equipments on your cars and you'll hear such profitable conversation, too!

## SAFETY CAR DEVICES CO.

Main Office—Boatmen's Bank Bldg., ST. LOUIS, MO.

CHICAGO  
Railway Exchange Building

NEW YORK  
City Investment Building

PITTSBURGH  
Westinghouse Building

CANADA—Canadian Westinghouse Co., Ltd., Hamilton, Ont.



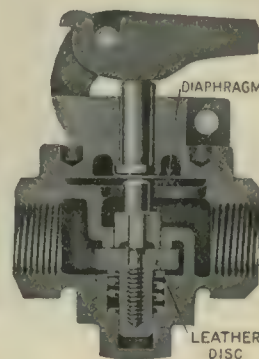


# PRODUCTS

*Quality First*



## O-B Sanding Equipment Easy on Compressor



Ever hear air whistling out of a sander valve when the motorman applies sand? Or ever see the motorman's window all dirty from moist, oily air which has leaked out around the valve stem? When air is used for brakes, for door opening and for sanding, a compressor has enough to do without acting as a clearing house for atmosphere.

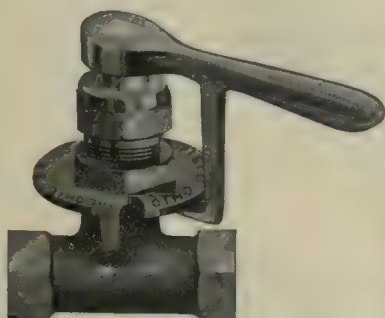
O-B Diaphragm Sander Valves can't leak around the stem. The two-piece plunger is separated by a flexible, airtight metal diaphragm. The valve is located directly over the motorman's valve and operated by a slight pressure on the handle. Closes automatically and positively.

O-B Independent Valve is opened or closed by a quarter turn. Located at any convenient point.

O-B Reducing Valve enforces economical use of air. It lets through only enough for good sanding. O-B Sand Traps have full, free passages.

O-B Wire Sander Hose may be placed so that the sand is always applied on the rail—even on curves.

## THE OHIO BRASS CO., Mansfield, Ohio



O-B Air Sander Valve. Independent Type



O-B Reducing Valve



O-B Air Sand Trap. Sectional View





**A Break Here Would  
Cause Quite a Tie-up  
But San Francisco Uses**

# Phono-Electric

And San Francisco seldom has a tie-up in traffic. Seattle uses Phono-Electric Trolley Wire, too, on sharp curve sections as shown in the circle. Something tougher and more durable than copper is needed to take the grinding at the curve, or the smash of the dewired wheel.

For such situations the obvious thing to do is to use a smooth-running trolley wire that stays up two or three times as long as copper.

That means Phono-Electric. Start by protecting your important points with Phono-Electric Trolley wire.

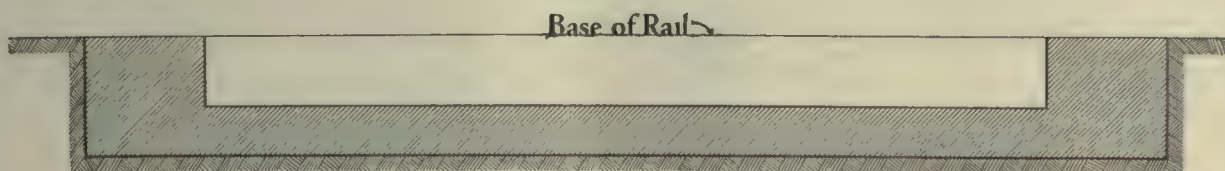
**Bridgeport Brass Company**  
**Bridgeport** **Connecticut**



# Cut Your Labor Costs 50%

with

## INTERNATIONAL STEEL TWIN TIES



This diagram shows graphically the reason why Steel Twin Tie Track can be built at a large saving compared to wooden tie track on concrete ballast or at the same cost as plain ballast construction.

It represents the comparative sizes of the track trench required for wooden tie track designs (the larger one) and that required for steel twin tie track (the smaller one).

An 8-foot wooden tie requires a trench 9 feet wide, and whether concrete or broken rock ballast is used the trench must be 12 to 14 inches deep.

Standard Steel Twin Tie Track requires a trench only 7 inches deep and 7 feet wide.

***Look at the shaded portion of the diagram;  
it represents the labor saved in excavating***

***AND the labor saved in mixing  
concrete***

***AND the labor saved in placing  
concrete***

***AND the labor saved in repaving***

Railway track all over the country is in a run down state—far below that 85% new condition which experts call excellent maintenance.

And while your track is run down and is causing delays in schedules, losses in the power house and deterioration of equip-

ment, you cannot render the service the public demands if it is going to look favorably on a fare-increase.

Durable smooth steel twin tie track with a ten-year record behind it will win good will for you.

*Our 1919 prices reflect steel market declines*

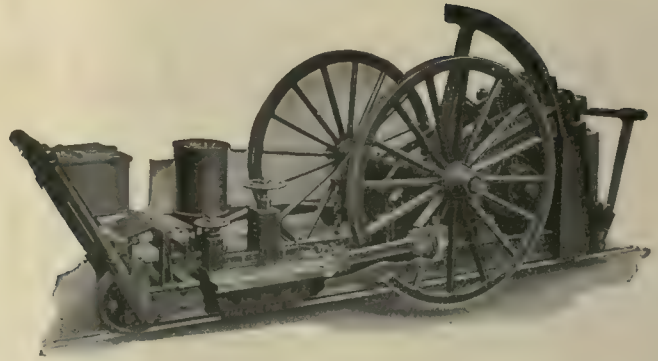
*Get them for your estimates*

# The International Steel Tie Company

Manufacturers of Steel Twin Ties and Crossing Foundations

General Sales Office and Works: Cleveland, Ohio





# ***CHOOSE!***

## **The Reciprocating Track Grinder**

has clearly and completely shown its ability to greatly prolong the useful life and service of track.

The only alternative to the consistent use of a Track Grinder for eliminating corrugations and cupped joints is the relatively early replacement of track.

The great economy of track grinding as compared with the loss of years of track service makes the choice easy.

And that is to say nothing of the saving in the decrease of wear and tear on rolling stock and the general advantages which accompany smooth, well maintained track.

### **RAILWAY TRACK-WORK COMPANY**

30th and Walnut Streets, Philadelphia

---



# *The Public Service Co.* *are large users of the* *most highly developed* *incandescent headlight* *that money can buy—* *The “Golden Glow”*



To the “man on front” the “Golden Glow” Headlight is a real friend.

To executives and trained engineers “Golden Glow” has a real meaning. They see in it permanency, safety and efficiency. They know that “Golden Glow” headlights will wear for years. They know that their reflectors project a powerful, penetrating, non-blinding light—a safe light. That they are efficient because they project all of the light—that there is no wasted “Golden Glow.”



These are, briefly, the reasons for using “Golden Glow” headlights. And when such a progressive and representative railway as The Public Service Co. use them—surely that substantiates our claims.

Do as hundreds of railways have done—buy “Golden Glow.”

The Public Service Co. are also large users of Keystone Steel Gear Cases. And practically every car on their many lines is equipped with our Illuminated Car Signs. They are one of many firm believers in using Keystone Specialties.

## **ELECTRIC SERVICE SUPPLIES Co.**

*Manufacturer of Railway Material and Electrical Supplies*

**PHILADELPHIA**  
17th and Cambria Streets

**PITTSBURGH**  
335 Oliver Building

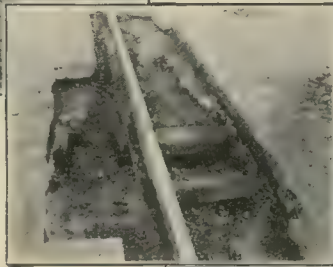
**NEW YORK**  
50 Church Street

**CHICAGO**  
Monadnock Building





**Simplicity Itself to  
Rectify Low and  
Uneven Joints!**



## The Dayton Rail Joint Booster

You finally decide to correct that joint—*but you don't want to interrupt schedules.*

The pavement and superstructure immediately surrounding the low joint to a depth of 13 or 14 inches below the rail base are removed. The old joint tie is cut in two and the part supporting the joint is taken out.

The Joint Booster is clamped in place on the rail base and welded its full length. The rail is jacked up to the correct level and the trench beneath the Booster vamped with slightly damp concrete, and the pavement replaced.

The cupped ends of the rails are built up and ground to surface.



*Order One for Trial Under the Worst Low Joint on Your Lines.*

**THE DAYTON MECHANICAL TIE CO.**

201 Third Street Arcade  
DAYTON, OHIO

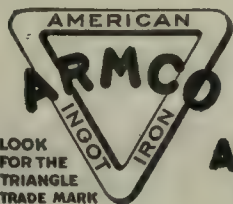




## ten years of heavy traffic— no deterioration

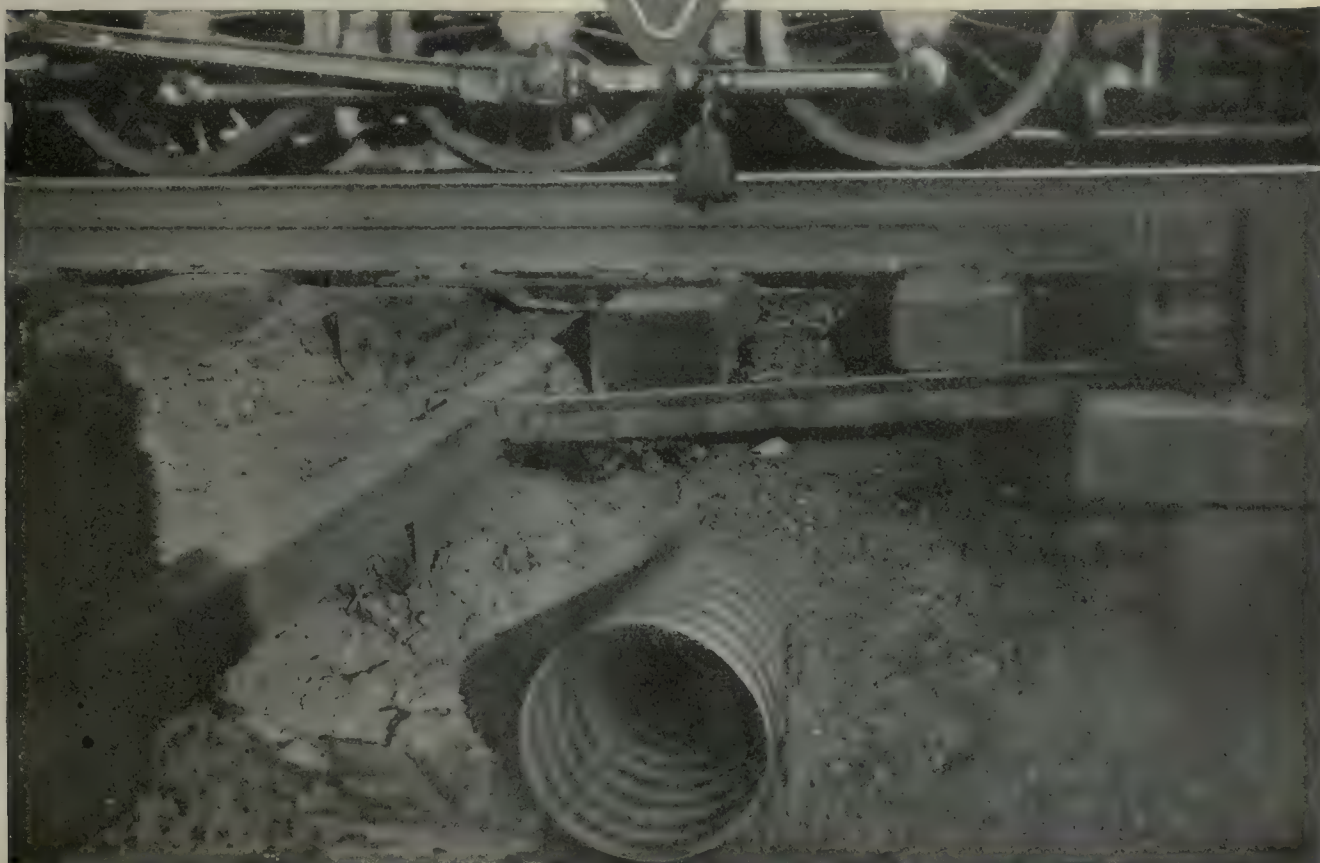
Every time a heavy train passes over these rails, the **ARMCO** Iron Culvert, only a few inches beneath them, must withstand a succession of sledge-hammer blows. After being subjected to this terrific strain for ten years it is in exactly as good condition as when it was installed in 1909.

It is proofs like this which back up the statement that **ARMCO** Iron Culverts are *permanent* improvements.



There is a manufacturer in nearly every state and in Canada, making genuine rust-resisting **ARMCO IRON CULVERTS** and other products of **ARMCO IRON** such as flumes, siphons, tanks, road signs, roofing, etc. Write for full information and nearest shipping point on products in which you are interested.

**ARMCO IRON CULVERT & FLUME MFRS. ASSN.**  
**TRANSPORTATION BLDG. CHICAGO**







Bowery, Between Chatham Square and Bayard St.

### Obliterates the Rail Joint



Finished Thermit fully Welded  
Insert Rail Joint

# Thermit Insert Welds 4 Years Under Heavy Traffic —No Breaks—

## Other Thermit Uses

*Making up special work. Welding compromise joints. Repairing broken motor cases and car truck frames. Rendering the Electric Railways independent of any shortage of new steel products.*

Four years ago all rail joints on the Third Avenue Railway System were *obliterated* by the Thermit Insert Weld Process.

Since then—in spite of continuously heavy traffic—in spite of the terribly severe winter of 1917-18 with its months of zero weather—no breaks have occurred.

This is only one instance of Thermit Insert Weld efficiency. These welds not only insure a smooth, continuous track, but a track that *stays* smooth and stays continuous during the entire life of the rail. The Thermit Insert Weld Process is the only process whereby you can repair a not-too-battered rail joint without inserting a new piece of rail. Send for Catalog No. 12—or a personal representative.

## METAL & THERMIT CORPORATION

Successors to Goldschmidt Detinning Co. and The Goldschmidt Thermit Co.  
120 BROADWAY, NEW YORK

329-333 Folsom St., San Francisco, 15 Emily St., W., Toronto, Ont. 7300 So. Clinton Ave., Chicago.  
1427-1429 Western Ave., Pittsburgh, Pa.  
Factories located at Chrome, N. J.; Wyandotte, Mich.; East Chicago, Ind.; Jersey City, N. J.





## National Pneumatic Second-Saving Specialties Essential for Best Train Operation

There is no worth-while economy in surface car train operation unless the increased number of stops made and passengers carried are set off by faster handling of the passenger and prompter transmission of the starting signals. These necessary savings in time are obtained to the greatest possible degree only with

### **National Pneumatic Door and Step Control**

For the quick, positive, laborless operation of doors and steps.

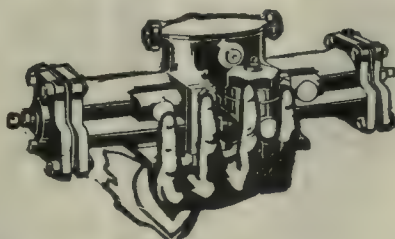
### **National Pneumatic Interlocking Safety Door Control**

For the absolute prevention of the platform accident.

### **National Pneumatic Motorman's Signal Lights**

For the immediate starting of the car after the doors are closed.

*We shall be glad to furnish full particulars at any time.*



# NATIONAL PNEUMATIC COMPANY

INC.

50 Church St. New York



515 Laflin St. Chicago



# Abbott Rail-Joint Plates

## pay big returns in lengthened track life

**Q**UITE frequently Abbott Plates are purchased for use on old track, where without such joint support the rails would have to be renewed. The life of old rails has been prolonged in this way for many years and at a cost that made the plates and their installation highly practical.

However, by delaying installation until track gets old some of the best benefits are lost. Rails protected *at the start* by Abbott Plates will permanently retain a perfect joint surface, and the better riding qualities will be accompanied by an appreciable decrease in upkeep attention, in charges for rail, angle bar, bolt and tie renewals.

Abbott Plates are applicable to any type and size of rail section and can be obtained in patterns that conform well to various operating conditions.

*Post yourself further on this subject by getting our booklet "Improved Track Appliances."*

309



### Lackawanna Steel Company

LACKAWANNA, N. Y.

ATLANTA	CHICAGO	DETROIT	ST. LOUIS
BOSTON	CINCINNATI	NEW YORK	SAN FRANCISCO
BUFFALO	CLEVELAND	PHILADELPHIA	



# DAVIS STEEL WHEEL

THE STANDARD FOR SERVICE

---



A car wheel  
which will give  
you full mile-  
age and without  
the expense of  
several turn-  
ings.

AMERICAN  
STEEL FOUNDRIES  
NEW YORK CHICAGO ST. LOUIS



# WILL YOUR MOTOR TRUCK BE AN ORPHAN ?

**T**HERE are thousands of truck orphans left on the hands of their owners. Their makers have gone out of business. It is reported that, of 555 companies organized since 1909, 331 no longer exist. Half of the remaining are less than two years old. 228 lasted but a year.

Making motor trucks is a large scale operation. Only the resourceful succeed. Some makers lack the capital. Some lack the output for economical manufacture.

Motor trucks are an investment. Rightly used, they should earn dividends large enough and long enough to write themselves off the books and *then* make a clear profit. The investor in a bond is as keenly interested in the soundness and stability of the issuer as he is in the terms of the bond. So the purchaser of a truck should be interested in the permanence and stability of the maker.

Any mechanism designed to last is

a doubtful value if the maker can not be counted on to remain in business and back up his product. The purchaser invests *also* in the maker's experience, in his reputation and in his service facilities. Of what use is a truck if parts are no longer available? What resale value does it have without a maker? Who will furnish service to the owner?

A purchaser can judge these things by: Years in business, Financial statements, Performance records, Number of trucks in service, Size and growth of output, Reputation of the product, Service facilities *already* established.

*The Purchaser of a White Truck Backs His Investment in It with the Strength of The White Company, with Its Years of Successful Experience, with Its Thousands of Trained Employees, with Its Tens of Thousands of Trucks in Active Service, with Its Millions of Capital, and a Service Organization, Nation-Wide, which Has No Parallel in the Industry.*





## The "Jumping-Off Place" to the Gold Fields



Kansas City was that in '49 and the early fifties because it was then the last completely equipped outpost of commerce west of the Mississippi.

To the men of that generation Kansas City was a busy center of commerce and from that day to this it has been a "starter" of many things for the greater service of the people of the Middle West.

It was one of the first cities in this country to develop and put into service the idea of a "Union" station for all the railways entering its gates.

The picture shows that early union terminal as it appeared forty years ago. Kansas City was the first community equipped with the overhead trolley system for street railways.

The impetus which rapid transit gave the city's growth was quickly appreciated and other communities throughout the country rapidly developed the same methods.

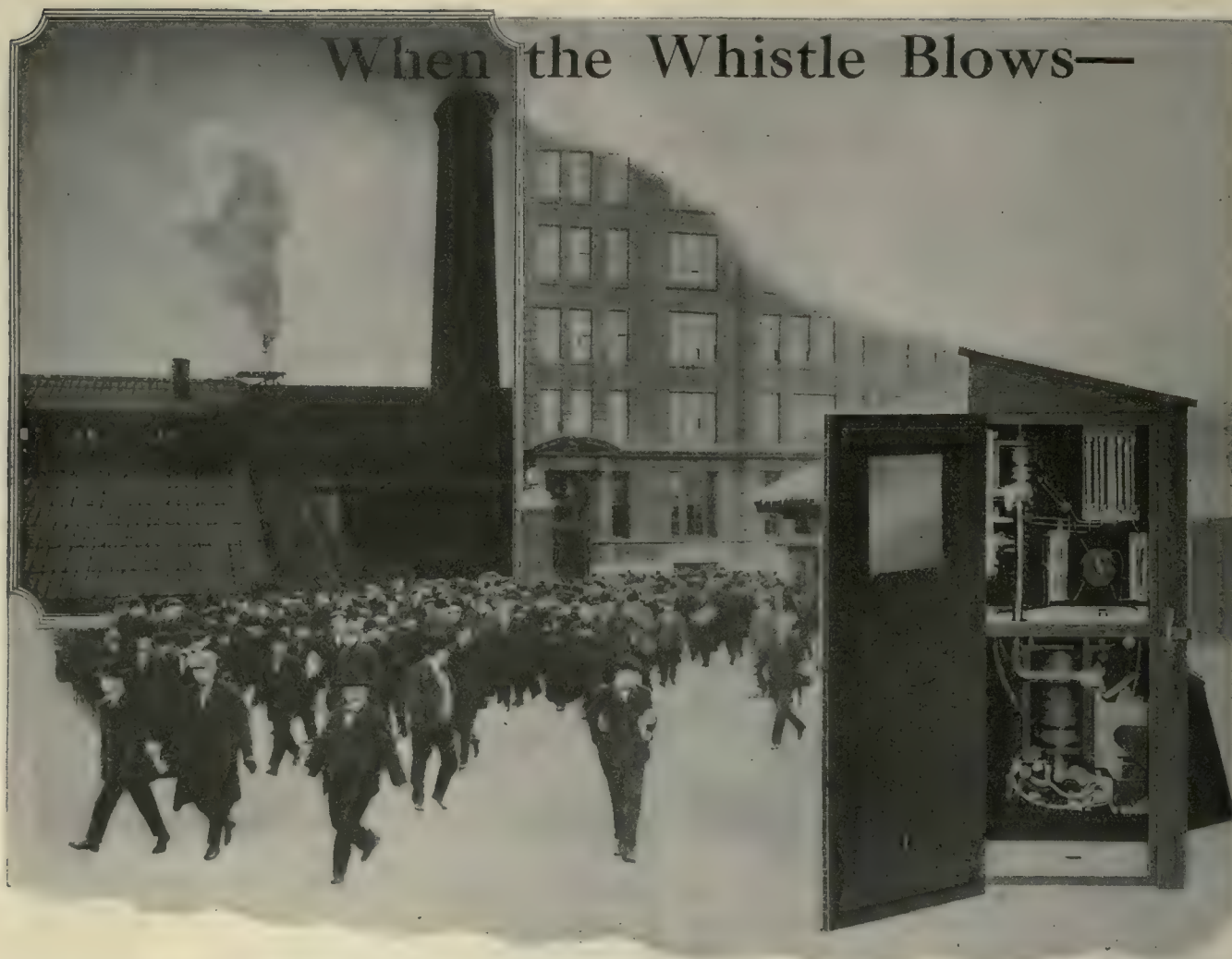
## Galena Oils *and* Galena Service

gave an impetus to the art and science of lubrication that has enabled that art to keep in step with the constantly growing and changing needs of the railway industry, and have always retained their positions in the forefront of the lubricating industry.

# Galena-Signal Oil Co.

Franklin, Pa.





## Let the G-E Automatic Sectionalizing Switch take care of your overloads

Do you know that without any outlay for more copper, you can keep *all* your feeders working all the time and maintain the highest possible voltage *at all points*?

The G-E Automatic Sectionalizing Switch will do this. By means of these switches, all sections are tied together, equalizing the voltage all along the line, making additional power available to handle heavy loads. In case of a short circuit at any one point, the switch automatically isolates the affected section until normal conditions have been restored.

*Can you afford not to investigate this switch?*

**G-E LINE MATERIAL**  
Can Be Shipped Promptly from stock

**General Electric**  
General Office **Company** Schenectady, N.Y.



# Electric Railway Journal

Consolidation of STREET RAILWAY JOURNAL and ELECTRIC RAILWAY REVIEW

Volume 53

New York, Saturday, April 12, 1919

Number 15

## It's Time for Some One to Start a New Company Section

THE silver trophy cup which was presented by this paper to the American Electric Railway Association last year to encourage the formation of company sections of that organization, reposes undisturbed in the offices of the Rhode Island Company at Providence. Now that the war is over, actually if not nominally, it is to be expected that challengers for the cup will appear. It was the idea of the donors that the cup would serve as a stimulus to friendly rivalry and as an aid to organizers of sections in stirring up local pride and enthusiasm. The officers of the association, in accepting it, expressed the belief that it would do so.

For a time before the United States entered the war the company section movement showed signs of suspended animation, as was natural. In the period between 1914 and 1916, inclusive, sections were being formed at a rate better than two per annum; then the rate fell off to about one. The Toledo section was formed early in 1917 and this husky youngster (a four-sided joint organization, to be sure) surprised everyone recently by passing the 1100-mark in membership, with greater expansion probably still to come. Just a year ago the Rhode Island Company section came into existence with a record-breaking initial membership. Who's next?

## Make the Association Office a Storehouse of Data

ONE of the principal functions, possibly the principal function, of the American Electric Railway Association, is to collect and disseminate accurate information regarding the industry. The need for some such agency is becoming more acute every day, especially at the present crucial time. The association can afford to spend a very large sum each year for this purpose, and the money will be forthcoming to the extent needed if the association's bureau of information and statistics can demonstrate its ability to do the required work properly. Previous activities of the bureau of information have laid a foundation for the work which is now to be done, but the association must enter upon a new statistical era if it is to play its proper part in electric railway financial and physical rehabilitation.

But no statistical bureau can create data. All that it can do is to learn what information is needed, provide a mechanism for getting it, impress on those in possession of it the importance of giving it up for the common good, arrange it in convenient form for reference and send it out wherever the need for it exists. One of the difficulties in the past has been to convince the electric railways of the country that accurate data are really needed. The situation has been explained by President Pardee of the association, P. H. Gadsden, chairman of the committees on readjustment and national relations, and others. While at Washington as the representative

of the association Mr. Gadsden was particularly embarrassed by his inability to put fully convincing figures before the governmental bureaus.

The executive committee of the American Association has placed in charge of the bureau of information and statistics a man who has had excellent experience and training for this particular work, namely, J. W. Welsh, formerly electrical engineer Pittsburgh Railways and later engineer with the Division of Transportation and Housing, Emergency Fleet Corporation. Mr. Welsh prepared the outline of the recent activities of the bureau published in the March 22 issue of this paper. We bespeak for him the active co-operation upon which he must depend. He will need it.

## How One Association Will Help Member Companies

ELECTRIC railways in some twenty-five states maintain associations, sometimes in conjunction with electric light companies and in other instances by themselves. In certain of these joint associations, during the past three or four years, interest in railway subjects has had a tendency to lag, due partly to the fact that many railway operators have been too busy—or have thought they were too busy—to prepare papers and attend the meetings. This is to be regretted because such gatherings should have been particularly helpful during the trying period through which the railways have been passing, if for nothing more than because misery likes company. However, this belongs to the past. There are many serious problems ahead for the electric railways, and it is important for them to get together and do what they can to solve these questions.

This seems to have been the idea which prompted the retiring president of the Wisconsin Electrical Association, in his address a few weeks ago, to recommend that on one day of each convention the sessions be divided so that the railway attendants may discuss, apart from the light and power section, problems which are of paramount interest to their industry. This suggestion was acted upon quickly and, as mentioned in the report of the meeting last week, a committee was appointed and before adjournment presented recommendations. These call for the organization of a separate branch of the association to be known as the Railway Division and to comprise five separate committees, one each on attendance and program, shops and equipment, transportation, way and structures, and power and distribution. It was also recommended that this division hold annually, aside from the regular convention, a two-day meeting on the property of some member company, to be devoted to a study of the property with recommendations for improved efficiency.

This suggestion should redound to the benefit of every member company, for eventually each will receive the



opinion of every other operator in the State as to how his property can be operated more efficiently. It will be a sort of consultation of physicians, as it were, over a sick brother. And we are of the opinion that it may be a stimulant to advanced efficiency also, as each patient about to be the subject of the consultation will wish to appear to the best advantage.

It is to be hoped that all associations which have suffered a setback during the war will now draw themselves together in a similar manner for a concerted effort to put new enthusiasm into the industry.

### Select Rail Sections with the Idea of Using Association Standards

**T**HERE are many things in the way of lack of uniformity in practices of railroads that should be corrected, and one of these is the rail section." Thus spoke C. A. Morse, president of the American Railway Engineering Association in his address at the recent annual convention. He had reference to the fact that, while his association has standardized seven rail sections between 70 and 130 lb. in weight, there are being rolled to-day some fifty different sections between those weights and twelve of them are variations of the 100-lb. rail alone. He also said that thoughtlessness and lack of knowledge of this unfortunate situation is probably the cause of such a state of affairs. Another factor is the ambition on the part of engineers to "design something."

We are inclined to agree with Mr. Morse in his analysis and think his strictures could be applied equally well to the rails used by electric railways, and those standardized by the American Electric Railway Engineering Association. For instance, we wonder how many electric railway engineers know that their own association has standardized the same sections as the American Railway Engineering Association from 80 to 100 lb. How many continue to order 80-lb. A. S. C. E. rails in preference to their own 80-lb. A. E. R. A. standard? Again, how many electric railway engineers know that the 7-in. 80-lb. and 7-in. 91-lb. plain girder rails which they order as L. S. Co. Sections 80-335 and 91-375 are really their own association standards also?

To turn to the Engineering Association's standard groove girder rails, there appears to be an opinion among many that these sections are too heavy for most roads. The 7-in. standard groove girder rail weighs 122 lb. per yard, but when it is remembered that very few substantial groove rails weigh less than 105 lb. and most reach 112 to 116 lb., it will be seen that the standard is really not unduly heavy when its merits are fully considered. We know of one road which abandoned a 105-lb. rail of this type in favor of the 122-lb. association standard, and the change has proved to be very wise. There have been fewer paving and joint troubles, while better joints and a smoother riding track have been secured.

At present prices and costs, an increase in weight of 17 lb. in the rails would probably add to the cost of relaid track, complete, between 1½ and 2 per cent, but this is more than offset by a prospective increase in head wear or rail life of from 20 to 25 per cent, to say nothing of the greater salvage value of the heavier rails. Hence, when a company is about to order rail, it should be very certain that it cannot afford to use the Engineering Association standards before choosing some non-standard rail.

### What Others Think and Recommend

**H**OLDING the looking glass up so that we may see ourselves as others see us may not be a flattering experience, but it is sometimes a profitable one. This is the conclusion arrived at by a railway man who writes to us and whose letter touching on answers to our recent questionnaire is printed in the communications department in this issue. This gentleman, who signs himself "Manager," refers to the series of articles which appeared in three issues of this paper, giving the views of representatives of the public on the questions of increased fares, publicity, franchises and municipal ownership. We are pleased to have furnished the medium for this "analysis of public thought" and hope the electric railway industry will take to heart some of the opinions expressed.

There is no question but that there have been and still are mutual misunderstandings on these important subjects. The industry is undoubtedly suffering from sins of the past, but the leaders of these public utilities should take courage from the fact that those who speak for "the opposition" are not insisting that the doors be shut against compromise and harmony in the future. Instead they offer many a suggestion which might be used in a "get together" policy, with strong possibility that these companies may be saved from financial ruin.

Lack of frankness and open-handed dealing appear to have been the basis for misunderstanding in the past. Railway men would charge these faults mainly against "the other side," but the public brings this indictment solely against the corporations. We believe that to a certain extent both are right, and, this admitted, there appears to be a ground for future co-operation. Perhaps we might clear the atmosphere by dismissing such terms as "the opposition" and "the other side" when referring to the public, because the triumvirate of co-operation which is getting best results these days is the one which reads: "The public—the employee—and the company."

Leaders of the industry at the recent mid-winter conference of the association seem to have recognized public clamor to a considerable extent when they united on a policy of basing future appeals for popular support on an honest valuation. This policy if carried out in a proper spirit would silence the cry against "overcapitalization" and "profiteering." There is not so much dispute over the rate of return to be allowed capital in these utility corporations as there is upon the question of the valuation on which the return is to be granted. There will, of course, be a difference of opinion over methods of valuation and the items to be included therein, but if harmony is ever reached on this issue—as it will through sincerity of motive on both sides—a settlement should not be a difficult task.

Proponents of the public point of view also point out some of the deficiencies in the publicity practice of the utility corporations. We seem to have gone wide of the mark in this policy also, in spite of well intentioned methods. Here again we may profit from listening to the advice of those whom we have been seeking to convert. It has been said that publicity is a two-edged sword, and he who would use it must remember that if he expects the public to believe the facts as he relates them he must be prepared to open his books wide and reveal the whole story, good and bad alike, of his corporate stewardship.



We urge careful study of this series of articles on the men who are responsible for the well-being of our industry, and we respectfully call their attention to the old saw: "There is none so blind as they that will not see."

### Utilizing Employees' Co-operation in Promoting General Good-Will

ELECTRIC railway managers have sometimes been criticized for not utilizing to a greater extent the opportunity to improve relations with the public through the good offices of the platform men. In fact, this was touched upon in an editorial in these columns recently. In justice to the managers it must be said that up to within a year or so, they have been handicapped in doing this very thing because the average platform man did not stay with any particular company long enough to become imbued with the manager's spirit. Platform work for electric railways for a long time was looked upon as of rather a transient character. It was considered by many as a makeshift, something to fall back upon when nothing really attractive offered. Obviously it was very difficult to develop a spirit of loyalty to a company and a desire to please the public under such circumstances.

Conditions, however, are different now. Without entering into a discussion of the adequacy or inadequacy of past wages in this field, we can say that electric railway wages now are, on the average, high, considering the requirements of the work. The result should be a greater average length of service on the part of employees. Not only are the wages higher in dollars and cents but they will become relatively higher as the fabulously large wages paid by manufacturers of war materials fade gradually from actuality to memories.

It is particularly desirable now that an effort be made to secure the active co-operation of the men and this, as pointed out, should be easier than heretofore. It must be done largely through the supervisory force, because good spirit can be engendered effectually only through man-to-man contact. It ought to be possible to have throughout an organization a spirit of good-will, provided the employees stay long enough to be affected by the contagion. One of the latest attempts along this line is the suggestion campaign inaugurated by The Connecticut Company a few days ago. Reference was made to this in our news columns for March 29. Briefly, the thought was to encourage two ideas. One was for all employees to offer suggestions and in other ways help to conserve the company's resources and increase its income so that it may be established in as sound a financial condition as possible. The other was to improve public relations by courteous and efficient service at all points. A report just received indicates that the men are taking a cordial and active interest in the campaign and good results are expected. The work will be followed up by means of monthly letters. Other companies have done somewhat the same thing in different ways, with varying degrees of success.

Organizations of the men can be utilized also, particularly the company sections of the American Electric Railway Association, which should be formed now in considerable numbers. The main hope in all this, however, is that increasing permanency of electric railway employment will permit whatever measures are used to be reasonably effective.

### What a Six-Day Week Would Mean

IN AN EDITORIAL in the Feb. 15 issue of this paper we warned electric railway interests to be on their guard against the agitation for eight-hour laws in the various state legislatures. We called attention to the fact that what the unions really wanted was a "basic" eight-hour day, or time and a half or double time for all work extending over that period. In other words, this was a camouflaged attempt to add to the wage burdens which already weigh so heavily on these public utility companies.

Another bid for more wages, also under the guise of a plea for conservation of human energy, is now being pressed in certain sections of the country. This is known as the six-day labor week. Its effect, to make the employer bear all the additional expense of the proposed change, is frankly admitted in a recent issue of the official organ of the Amalgamated Association. The editor of that paper believes that employing companies are opposed to such legislation because it would mean increased payroll expense, and he says frankly that a six-day week instead of a seven-day week would mean a 16½ per cent increase in wages.

The writer also makes the point that the companies in arbitration cases "always endeavor to cover the injustice of the seven-day week by creating the presumption with the arbitration board that the work is of such type that men can easily endure the continuous employment that working 365 days per year requires." The fact is, as we understand it, that in the usual arbitration proceedings, it is contended that electric railway employees have steady employment, offering work every day in the year, and that with fair allowance for occasional days off duty these men are able to secure an annual income greater than that of many workmen in trades which offer a higher hourly rate of pay.

This proponent of the six-day week also argues that the "patriotic impulse" should induce these companies to adopt this method of extending employment, because "it would mean the employing of not less than 115 men where 100 are employed under the seven-day week privilege." It is well that the case of the employees is so frankly stated. There is no camouflage in this argument, but it contains a plain admission that these companies which are already so hard pressed because of the high cost of operation and inadequate fares would have to pay their present employees 16½ per cent more in wages and add 15 per cent to their number—probably with a guaranteed minimum wage to all the extra men.

The employing companies should be equally frank in showing what this additional weight to their wage burden under present financial conditions would mean. Briefly, it would imply bankruptcy for a large percentage of the properties, and inferior service from those that survived, on the theory that none should be required to furnish service beyond their financial ability. Of course this would react on community development and, in the end, would affect adversely the men who depend on these utilities for their livelihood. It is a plain case of a vicious circle. We would suggest to the editor of that paper that his association might better use its influence toward securing a living return for these companies before asking that they do what is now impossible.



# Detroit United Railway Builds Large Stone Crusher Plant

**Crushers Taken from an Abandoned Quarry Are Used to Equip a Plant of 500 Cubic Yards Per Day Capacity in Salvaging Waste Materials for Ballasting**

EVERY electric railway of any considerable size needs a stone crusher. Whether it be portable or a permanent structure depends upon the size of the property, the amount of material to be crushed per year and other local conditions. In former years much material, such as broken concrete, old brick, paving blocks, etc., has been hauled to a dump and used for filling-in purposes, sometimes thereby becoming of some use, but in many cases the disposition being considered only as a part of the necessary expense of maintenance and rehabilitation. With the advent of the necessity of every kind of economy, many railways have come to realize that this material is worth something and can be salvaged for further use. The Detroit United Railway operates 857 miles of city and interurban track. The latter, especially, requires large quantities of ballast both in maintenance work and for new construction, amounting perhaps to an average of 25,000 cu.yd. in a normal year. It is believed that 15,000 cu.yd. of this can now be furnished from salvaged waste material made available by a new crusher plant which was placed in operation in May, 1918, at the Oakwood yards of the company.

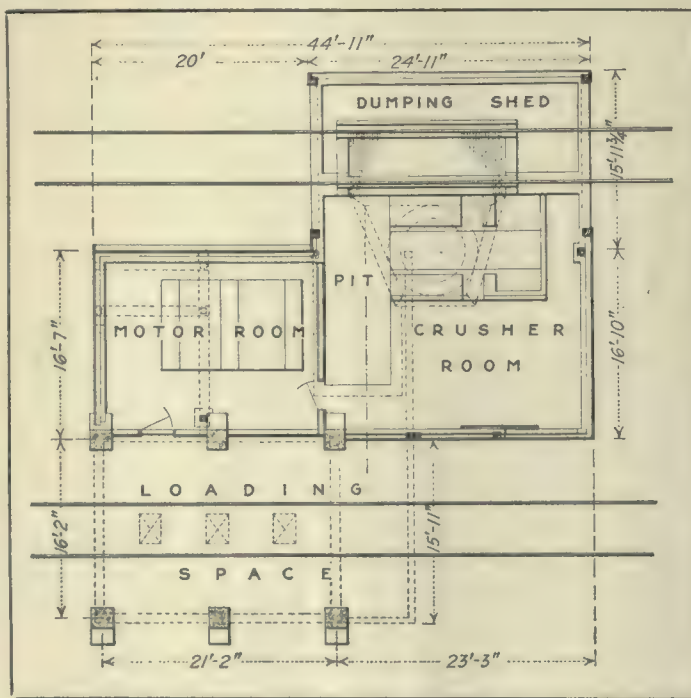
The plant is located on the southwest side of the Oakwood yard, immediately adjacent to the main line of the Detroit, Monroe & Toledo Short Line Railway, an interurban line operated by the company. This location not only has the advantage of simplifying the transportation and handling feature, but also made available a site which entailed no trestle construction and a minimum amount of fill as is indicated in accompanying illustrations.

The general layout of the plant is shown in the floor plan. The foundations are of concrete carried down to a hard clay bed, the base of the foundation being reinforced with old 56-lb. rail. The superstructure of the plant is of wood heavily reinforced and braced with steel angles, channels, I-beams, tie rods and built-up sections. The roof is shingled and the building is

covered with wood sheathing. The greatest height of the building, from the top of rail of the loading track to the peak of the roof, is approximately 56 ft.

A train of several side or center dump cars may be pushed by a motor car, up the dumping track incline into the dumping shed. Side dump, hopper dump or ordinary flat cars can be used. The side dump cars,

air and electric operated, unload direct to the hopper of the crusher. To facilitate the use of hopper dump cars, neither floor nor ties have been placed between the track rails in the shed, the rail being laid on an oak sill on the outer side and on a built-up steel section on the crusher side. The material drops on to a slide made from inverted old rail imbedded in an 8-in. concrete slab and placed at such an angle that the material passes by gravity into the crusher hopper. If it is necessary to resort to hand unloading, the operation is, of course, longer and the motor may be withdrawn. As each car is unloaded, the brakes are released and



FLOOR PLAN OF DETROIT UNITED STONE CRUSHING PLANT

the car passes down the incline, the next car taking its place over the hopper. The cars are then shunted into position under the storage hoppers on the loading track.

The large crusher into which the material first passes is an Austin No. 5 gyratory type removed from the Newport quarry owned by the company, but as mentioned before, now abandoned. The crushed material is discharged into a Stephens-Adamson continuous bucket elevator by means of which it is elevated to the top of the building and discharged into a standard 42-in. diameter No. 3 revolving screen made by the same company. This screen, which is 21 ft. long, is set with a slope of 1 in. to the foot and is divided into three sections, perforated to pass 1-in., 1½-in. and 2-in. sizes respectively. The screen revolves at the rate of 16 r.p.m.

The crushed stone and screenings pass into storage bins having a total capacity of 125 cu.yd. At the present time there is but a single hopper, although provision is made to separate the three sizes if de-





TWO VIEWS OF STONE CRUSHER PLANT OF DETROIT UNITED RAILWAY, SHOWING BOTH LOADING AND UNLOADING TRACKS

sirable. The storage hopper is formed of 10-in. x 10-in. Southern pine timbers braced with steel tie rods and lined with 2-in. x 12-in. Northern pine plank. The slope of the bottom is practically 1 to 1, the discharge into the cars being made through three openings each 24 in. x 32 in. These openings are closed by steel plates operated horizontally on roller bearings by rack and pinion controlled by a chain wheel at the side. Any material which is too large to pass through the screen is discharged into an open chute through which it passes by gravity to an Austin No. 2 gyratory crusher, also originally installed at the abandoned quarry. The material is discharged from this crusher down an incline to the foot of the elevator, where it passes back through the screen into the storage hopper.

The entire plant is driven by a 350-hp. Westinghouse motor, operating at 550 volts. This motor is far in excess of the needed capacity which is approximately 70 hp., but due to the introduction of individual motor drive in the Monroe shops of the company, this motor was thrown out of immediate service and its use here thus saved the purchase of a new machine. The motor is connected by belt to a shaft pulley, 11 ft. above the foundation. Connected to this shaft by belts are the No. 5 crusher, the No. 2 crusher and a second shaft. The second shaft is connected by belts to the elevator drive and to a pulley which drives the screen through a beveled gearing.

Construction work on the foundation of the plant was started in November, 1917, but no work was done during the winter months. The plant was completed and placed in operation in May, 1918, after approximately two months of construction work. Practically all the material crushed in the plant is old concrete, brick, paving blocks, etc., and this is used entirely for

interurban track ballast. Since the plant was placed in operation, approximately 7000 cu.yd. of material has been crushed. One foreman and three men operate the plant, and with dump cars can handle 500 cu.yd. per ten-hour day. The plant does not operate during the winter months, as there is no refuse material for disposal from reconstructed tracks. About 150 days in the summer months would cover the period of operation. As these men spend most of their time on other work, the actual time of operation is all that is chargeable to the crushing. The total cost of the plant was \$17,000. Allowing 20 per cent per year for depreciation, and 6 per cent per year on the investment, \$3,000 per year for maintenance, and operating the plant 150 days ten hours per day, the cost per cubic yard may be found by the following formulæ:

$$\left( \frac{\text{Depreciation} + \text{interest on investment} + \text{maintenance}}{\text{number of operating days} \times \text{number of cu.yds. crushed per day}} + \frac{\text{number of hours worked per day} \times \text{wage per hour}}{\text{number of cubic yards crushed per day}} \right)$$

In numbers this would amount to:

$$\left( \frac{3400 + 1020 + 3000}{150 \times 500} + \frac{40 \times 0.50}{500} \right) = \text{approximately 14 cents.}$$

In a letter to the members of the Electric Railway Section, National Safety Council, Chairman H. B. Adams points out that there is one expenditure in the accounts of electric railways which brings no return, namely, the settlement of accident claims. The elimination of the causes for such claims should demand closest attention on the part of those interested in the welfare of a company, and furnishes an avenue for the active employee to make himself most valuable. Safety propaganda is one of the greatest means of saving that can be used by an electric railway company.



AT LEFT, TRAIN UNLOADING MATERIAL INTO CRUSHER WHILE OTHER CARS ARE BEING LOADED; AT RIGHT, SIDE DUMP CAR UNLOADING INTO CRUSHER



# Zone Tickets Adopted for Portland

**Novel Ticket System Handles 97 Per Cent of Passenger Business—Frank Campaign Before New Schedule Became Effective Secured Understanding of New System and Appreciation of Company's Problems**

**A** NEW fare system based upon tickets went into effect on March 2 on the lines of the Portland (Me.) Railroad, operated by the Cumberland County Power & Light Company. The system, which embodies various novel features, was designed by the railway to accord with orders issued by the Public Utilities Commission of Maine under dates of Jan. 7 and Feb. 3, 1919.

On July 25, 1918, it will be recalled, the commission authorized the establishment of a central zone from 2.5 to 4 miles in radius, and the subdivision of all exterior lines into zones of varying lengths. The fare in the central zone was 5 cents, and the fare units in the outer zones were 2, 4 and 6 cents, with a minimum fare of 6 cents and an average rate of about 2 cents per mile.

During August and September, 1918, there was an actual net revenue gain of \$1,686 a month as contrasted with the sum of approximately \$10,000 a month agreed to be necessary. The company therefore petitioned for 6-cent fares on its city lines. Before the hearings were completed, the War Labor Board ordered an increase in wages causing an estimated deficit of more than \$20,000 a month. There being no expectation that 6-cent fares on the city lines would provide anywhere near the increased revenue required, the necessity

existed for constructing an entirely new fare schedule. The one adopted on March 2 represents the outcome of an exhaustive study of local conditions by the company and the commission, with the benefit of outside expert criticism.

## TICKETS HAVE REPLACED CASH FARES

The new system provides for the use of tickets in place of cash fares. The lines have been divided into a series of fare zones of as nearly equal length as possible (see accompanying map). The ticket fare for each zone is 2 cents, and the minimum fare in every case is 6 cents whether the passenger rides through one zone or three zones. The new fare limits are practically the same as the old ones, with the modification that the 6-cent central zone is subdivided into three fare zones and all 6-cent and 4-cent zones outside of the old central zone are also subdivided into three or two fare zones respectively.

There are several kinds of tickets, as illustrated herewith, to insure maximum convenience to the public. They are all transferable. Those designated as "ordinary" tickets are for 6-cent fares. A "zone" ticket is used in conjunction with the 6-cent fare ticket to pay fares which are more than 6 cents. "Through" tickets are used to accommodate those who ride fre-



NEW TICKET ZONE SYSTEM OF PORTLAND (ME.) RAILROAD



quently between points where the fare is 8, 10, 12, 18, 22 or 30 cents.

The ticket chiefly used is based on the 6-cent ride, five rides being sold in a block for 30 cents. No ticket for a single ride is sold. Each 6-cent coupon entitles the holder to ride through three fare zones. These tickets may be purchased from the conductors and at the Monument Square waiting room (the traffic center of the system).

The "zone" ticket is provided for "change." It has fifteen 2-cent coupons and sells for 30 cents. It is used with the ordinary 6-cent coupon in paying fares above 6 cents where the passenger does not regularly pay such fares; or with the 6-cent fare ticket to pay a fare through an odd number of zones, such as seven, where the fare would be 14 cents. In the latter case the conductor punches one of the coupons in the 6-cent ticket, which entitles the passenger to ride through three zones, and then punches four of the 2-cent coupons on the zone ticket. The zone ticket can be used to pay a 6-cent fare, in which case three of the 2-cent coupons are punched by the conductor. It can also be used to pay any fare up to 30 cents at the option of the

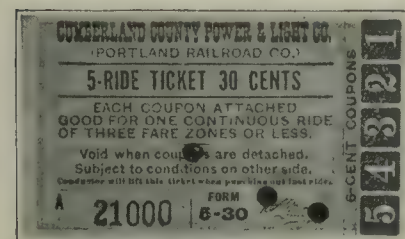
six zones pays the conductor 18 cents and receives six 1-cent rebate checks.

In all cases the passenger is entitled to receive a sufficient amount in rebate checks to reimburse him for the difference between the cash fare rate and the ticket rate. Conductors are not allowed to accept rebate checks for passage or to redeem them. The color of both kinds of rebate checks is changed daily, and each day's supply bears the date of issue.

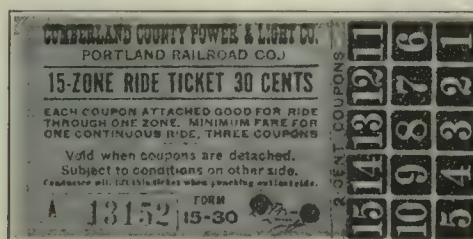
#### REGISTERING FARES AND HANDLING TRANSFERS

Conductors lift all tickets when punching out the last ride and register such tickets on the cash side of the register, making one registration for each ticket lifted. They register all transfers and free tickets on the transfer side of the register, lifting one employee's ticket for passage in or through each collection area. In punching coupons from tickets the conductors use a special square punch which enables them to work only from right to left, or from the first coupon to the last, in order.

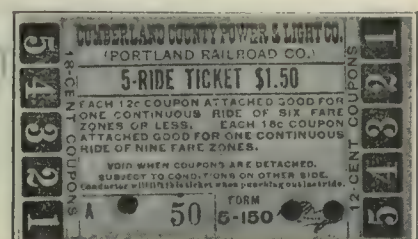
The minimum fare, as before stated, is 6 cents in every case. A passenger paying 6 cents on a given line



(A)

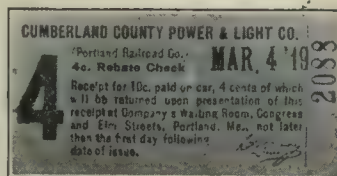


(B)



(C)

#### FARE TICKETS USED FOR ITS NEW ZONE SYSTEM BY THE PORTLAND RAILROAD



(D)

(a) Basic Ticket with Five 6-Cent Coupons.

(b) Supplementary Zone Ticket with Fifteen 2-cent Coupons.

(c) Specimen of Through Five-Ride Ticket.

(d) Four-cent Rebate Check Used with 10-cent Cash Fare for Three-Zone Ride or Less.

passenger. These tickets are sold by conductors and at the Monument Square waiting room.

The "through" tickets are issued in the form of five rides selling for 40, 50, 60, 90 cents, \$1.10 and \$1.50 respectively. At present, with one exception (conductors on the Westbrook line), these tickets are sold only at Monument Square. After the plan has been in operation for awhile, if there seems to be a demand for the sale of through tickets by conductors on other lines, the company plans to make the necessary arrangements to meet that demand.

#### USE OF REBATE CHECKS

When a cash fare is offered by a passenger in lieu of a ticket, the fare for a three-zone or minimum ride is 10 cents. A passenger paying 10 cents receives a 4-cent rebate check, which may be redeemed before midnight of the following day at fifteen points on the system, including the company's office (waiting room), hotels, Union Station news stand, terminals, etc.

A passenger without a ticket who rides more than three zones pays 3 cents a zone in cash. For each 3-cent fare the conductor issues a 1-cent rebate check, redeemable not later than the close of the following day at one of the designated points. Thus, a passenger who boards a car without a ticket and rides through

and riding only one zone, or 2 cents worth, on that line, is entitled to the balance of his 6 cents' ride on some other connecting line. This is why the old central zone was divided into three 2-cent zones. In addition the transfer feature provides for a central transfer zone (see map) with Monument Square as its central point. The limits of this central transfer zone are the outer limits of the first fare zone from Monument Square.

The transfer provides for punches of none, one, two or three zones. A passenger inbound to Monument Square who has paid 6 cents or more is entitled upon request when paying fare to a transfer permitting him to ride to any point within the central transfer zone. In the case of a passenger outbound from Monument Square who boards a car at any point within the central transfer zone, his journey is assumed to have begun at Monument Square. When paying his fare such a passenger upon request receives a transfer punched for "Zone 3." If a passenger boards a car in "Zone 1," the conductor punches out "Zone 3" on his transfer; if he boards it in "Zone 2," the transfer is punched out "one 2," and if in "Zone 3," it is punched out "Zone 1," the proper destination point being punched out in each case. If a passenger has ridden his full three zones, the conductor punches out "Zone 0."



Practically all outbound cars from Monument Square are "pay-leave" cars. When inbound to Monument Square, the passenger pays as he enters. This arrangement permits passengers to board and leave cars in Monument Square much more rapidly than formerly, and greatly reduces congestion at this important point.

Cumberland County Power and Light Company		RAILWAY DEPARTMENT	
REPORT OF TICKET SALES			
DIV.		LINE DATE	
191			
KIND OF TICKETS	ON HAND	TICKETS RECEIVED	TOTAL
	Large Starting No.	No. of Tickets	No. of Tickets
1c REBATE			
4c REBATE			
2c--15.30c			
6c--15.30c			
8c--15.40c			
10c--15.50c			
12c--15.60c			
15c--15.90c			
22c--15.10c			
30c--15.1.00			
TOTAL AMOUNT OF TICKET SALES			
1c RECEIVED WITH 5c TICKETS			
1c WITH 5 & 5 TRANSFERS			
CONDUCTOR			
TOTAL CASH			

CONDUCTOR'S REPORT OF TICKET SALES ON PORTLAND RAILROAD

The form used for a conductor's report of his ticket sales is reproduced herewith. The conductor's day card provides on the back for a report of tickets and transfers registered.

#### HUMANIZING THE PORTLAND RAILROAD

The new tickets were placed on sale eleven days in advance, but more than this was done. Before the new system was put into effect, the public was somewhat out of sympathy with the company's efforts to provide service in the face of mounting costs of operation. A. H. Ford, vice-president and general manager of the Cumberland County Power & Light Company, came to the conclusion that through direct personal contact with the public the management might make its purposes and difficulties understood. To effect this result, a series of nine district meetings was arranged in the outlying sections and the more thickly populated areas.

These meetings were held in the evening, at halls hired by the company, and were advertised in the press and by reading notices well in advance. The public was invited to offer criticism, whether destructive or constructive. The local superintendent, the general superintendent, the assistant to the vice-president and the general manager attended each meeting, and so great was the interest that every meeting lasted more than two hours.

On these occasions Mr. Ford put before the local public the essential facts as to the company's finances and explained either personally or through his staff the workings of the proposed new ticket system. The pub-

lic was given an opportunity to examine the tickets at leisure and to study how each district would be served and how the fares would be altered. The local press was also utilized through advertisements to explain the new system and to set forth points brought out at the meetings, and front-page news "stories" were carried by the papers both morning and evening in connection with the meetings. These of course were of great value in reaching the larger public which could not be accommodated at the meetings. An example of the company's frankness in approaching the public is shown in the accompanying advertisement regarding the rebate checks.

At each meeting the company's representatives welcomed criticisms and suggestions bearing upon the service and in some cases were able to put the latter into effect soon afterward, to the great satisfaction of the local communities. In other cases, it was necessary to take the criticisms and suggestions under advisement, or it was possible to explain at once why various operating changes could not be made. Hostility to the company was dispelled very rapidly by these meetings, and the public now is generally convinced that the manage-

#### TALK NO. 8

##### To the Patrons of the Portland Railroad Company:

The public meetings we have been holding, which have been well attended, have been of great value to the Portland Railroad Company. At these meetings some suggestions have been made for improving our service. We have adopted several of these suggestions and are giving careful consideration to all of them.

We have had some criticism of the ten cent fare with the four cent rebate check. It is the only feature of the new plan which the Public Utilities Commission has ordered the Railroad Company to put into effect which has been the subject of criticism. We think the people understand why this ten cent cash payment for a single ride is necessary. We have been ordered to use tickets instead of money for the payment of fares. Everyone can see that if the Company sold single trip tickets for six cents it would defeat the whole ticket plan which the Company has been ordered to put into effect.

We have obtained permission to modify the original order of the Public Utilities Commission and return a rebate check to the passenger worth four cents if presented at the redeeming points named, before the close of the day following the collection of the fare. We know this appears to be an awkward plan and will be something of an inconvenience to some of our patrons. The inconvenience can be avoided, of course, by purchasing the five ride six cent tickets for thirty cents. This is what the great majority of the people will do.

We frankly admit, however, that we are not sure that the rebate check plan is the best one that can be devised. We have another plan under consideration which would eliminate it but there are some objections to it which we are striving to overcome. We have submitted the alternate plan to experts and expect a report upon it soon. In the meantime we will go ahead with the ten cent fare, four cent rebate idea and see how it operates. Later if the alternate plan is deemed feasible we will adopt it.

Our whole idea is to serve our patrons just as well as we can and to put them to the minimum amount of inconvenience. We are much pleased with the good spirit with which the public has accepted our plans and the manner in which all are trying to help us out of our difficulties and it is our intention to show by our efforts our appreciation of the good feeling which exists.

A. H. FORD,  
Vice-President and General Manager.

#### HOW THE PORTLAND RAILROAD TALKED FRANKLY TO THE PUBLIC

ment welcomes its suggestions and will give them careful consideration.

The company also took good care of the public as the new fare system was being installed. For example, an article in the newspapers directed attention to the following:

That the campaign of education through the advertising columns of the newspapers and experience meetings held in various sections has familiarized people with practically every feature of the ticket system was shown by the readi-



ness with which they adapted themselves to the changed conditions yesterday.

The new transfer, which was expected to provide the most difficulty, seemed to have been mastered by the great majority, and only a few mistakes in this connection were made by the conductors. People who received the wrong number of zones on their transfers applied to the office of the company to have the matter straightened out, and in an advertisement this morning the management asks all who have trouble of this sort to come to the office for adjustment. Within a very short time everything will be running smoothly so far as the transfers are concerned.

Another thing to which the management wishes to direct attention relates to the purchase of the wrong kind of tickets. It has come to the knowledge of the officials that some have bought the kind of tickets that are not best suited for the trips which they are in the habit of making, and if these people will come to the office the mistake will be adjusted.

#### VERY LITTLE RIDING BEING LOST

Owing to the radical departure of the new schedule from the former system, together with certain new features pertaining to it, it is not as yet possible to form any positive opinion as to its operating success. The receipts in the first nineteen days' operation show an increase of 16 per cent over 1918.

It appears that the company is losing very little riding on account of the increase in fare from 5 to 6 cents on the short-haul city lines. This is attributed in considerable measure to the good feeling engendered by the public meetings in the various communities.

The number of rebate checks issued amount in money to about 3 per cent of the total passenger business; therefore about 97 per cent is ticket business. The company estimates that nearly half of the rebate business originates on the Union Station line, the rebate check being chiefly used by transients. The "pay-leave" plan for cars outbound from Monument Square is working out most satisfactorily.

### War Experience of Lyons Tramways

AT THE BEGINNING of the Great War the mobilization took about 1850 of the total of 3459 of the employees of the Compagnie des Omnibus et Tramways de Lyon, according to a recent issue of *The Electric Railway and Tramway Journal*. In the early part of 1915 the company had to engage women employees. The employment of women as conductors was tolerated, but in a general way they hardly gave satisfaction in this capacity. Recruiting of women workers had the following variations:

Calendar Year	Number Recruited	Number That Became Efficient	
		Conductors	Drivers
1915	560	*1,129	..
1916	1,417	1,045	47
1917	1,627	976	61
1918 (first half)	934	..	..

\*Ed's Note. Evidently includes some recruited during 1914.

The diminution in the efficient in spite of the more numerous engagements is said to prove that the new personnel was of very mediocre quality and found itself eliminated very rapidly.

In order to replace the 1850 men mobilized, the company up to Jan. 1, 1917, engaged 9230 employees, including 2312 women. Of the total 9230 there remain with the company 1950, the 7280 others being dead or out of the company's service on account of the successive mobilizations of the younger classes. With a staff so unstable, it is said to have been difficult to maintain good service.

The rolling stock suffered, on the one hand, from the heavy overloads it had to carry and, on the other hand, from the wear of the track and the running of the cars by inexperienced hands. The company suffered particularly from the deterioration of motor armatures and field magnets. The expert winders not being available, the company was forced to engage women. It had great difficulties also in getting materials for repairs, particularly during 1918, and a large part of the rolling stock must be repaired before it can be placed in operation.

## Elements of a Successful Outdoor Substation\*

In Wisconsin Electrical Association Paper the Author Outlined the Merits and Shortcomings of the Several Pieces of Equipment

BY ALFRED ALSAKER

Consulting Engineer Delta-Star Electric Company, Chicago, Ill.

OUTDOOR substation equipment was primarily developed for small substations but has later been partially adapted for large substations. For the latter the outdoor equipment is very similar to that used in indoor installations. For example, in the case of oil switches there is a difference in the bushings and a slight one in construction. Lightning arresters are correspondingly similar. For small substations, however, the equipment is entirely different in that high-tension oil switches and other costly apparatus are eliminated. In most cases the two functions that would ordinarily be performed by the oil switch, namely, manually opening the circuit and automatically opening it in case of overload or other trouble, are performed respectively by the outdoor-type air-break switch and the high-tension outdoor fuse.

Air-break switches are of two types, horizontal and vertical break. The horizontal-break switches are, in turn, of two types, one with a single break per phase and one with a double break. The vertical-break switches are all single-break up to 88,000 volts. All air-break switches are provided with arcing horns to prevent burning of the main contacts. As to relative breaking capacity of these switches, this is as yet largely a matter of opinion. Mine is that the single-break horizontal switch will not break the arc as effectively as the single-break vertical switch, but the double-break horizontal switch should naturally be able to break heavier loads than either type of single-break switch.

### FUSES CAN BE MADE WITH VERY SHORT TIME ELEMENT

The most important equipment for the operation of outdoor substations is the high-tension fuse. Of these there are several types. The horn-gap fuse is an ordinary fuse wire strung between two arcing horns mounted on insulators. For small systems this is a useful device, but where there is large power capacity beyond the fuse its use is not so practicable. By its very nature of operation the horn-gap fuse has a long time element. The simplest form of inclosed fuse is a wooden stick with a fuse wire inside. Another type consists of a fiber or glass tube with ferrules on the end connected by fuse wire. The first type has now been

\*Abstract of paper read at meeting of Wisconsin Electrical Association, March 27, 1919.



abandoned, the other has a comparatively long time element.

The expulsion type of fuse consists of a treated fiber or porcelain tube, with a fused wire inside having a reduced cross-section near the closed end of the tube. This fuse has a shorter time element than the others mentioned and has a wide application especially for small and moderate-sized systems. The carbon tetrachloride fuse consists of a glass tube with a metal ferrule at each end. A very short fuse is fastened between the upper ferrule, and a strong spiral spring is fastened to the lower and holds the fuse in tension. There is a cork around the fuse element which prevents the arc from communicating to the glass, and just below the cork is a nozzle or liquid director which is fastened to the spring. A flexible copper lead is run inside the spring to the lower ferrule and serves to conduct the current and keep it from heating the spring. The tube is filled with carbon tetrachloride, which is simply a high-grade fire extinguisher. When the fuse melts the spring pulls the nozzle away and squirts the carbon tetrachloride on the flame, thus extinguishing it. This fuse like all others has its advantages and disadvantages. The first cost is moderate but that of re-fusing is higher than for the expulsion type. It has a very small time element and will clear a circuit in as little as 0.004 second.

There are several types of high-tension lightning arresters used in outdoor substations, the simplest form being the plain horn gap. This is effective because it gives lightning an unobstructed path to ground but the dynamic current which follows is often large enough to trip the switch at the source of power. To cut down the rush of dynamic current some manufacturers use resistance in series with the ground horn, but this stops the lightning discharge as well as the dynamic current. By using a number of resistance units in series with the ground horns, it is possible to arrange them in such manner that lightning has a direct path to ground through several gaps.

The electrolytic arrester is primarily a horn-gap arrester, but instead of resistance in the ground circuit it has a series of electrolytic cells, which automatically build up a resistance or counter electromotive force as the dynamic current passes. It might be defined as a horn-gap arrester with a current-limiting device, having a definite break-down value and a definite recovery value. This type is too expensive, however, to be used on small outdoor substations; furthermore, it requires attendance, as it should be charged at least once a day. The oxide-film arrester is a new type which has the characteristics of the aluminium-cell arrester but does not require any charging.

#### WHEN IS A FUSE MORE ECONOMICAL THAN A SWITCH?

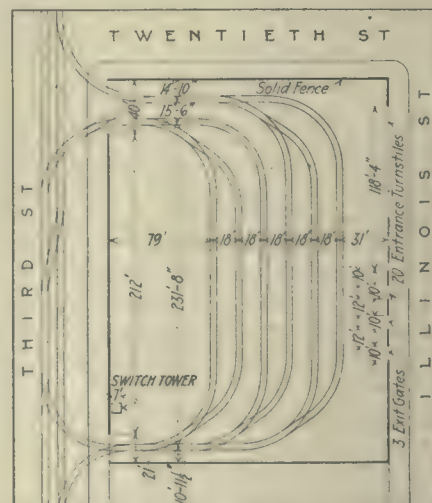
In closing I shall discuss a little further the question of high-tension oil switches *vs.* fuses for outdoor substations. It being assumed that it is possible by means of a fuse having an exceedingly short time element to obtain the same degree of protection as is provided by the best class of oil switches, the question then arises as to the conditions under which it is proper to use oil switches and when fuses should be used for the high-tension side of the transformers. In a very large substation containing several banks of transformers and several lines, the oil switch is undoubtedly the best thing to use. Where there is but

a single bank of transformers, the question is settled by the presence or absence of an attendant. If an attendant is available, power can be restored undoubtedly more promptly when an oil switch is used. On the other hand, an oil switch opens comparatively often while the fuse blows seldom.

When no attendant is present the situation is different. It may take the operator fifteen minutes to get to the substation in case of trouble, and one minute to determine what has happened and close the high-tension switch again. If a fuse is used he will require the same time to get to the substation and may take five minutes to open up the air-break switch and replace the fuse. It is up to the engineer to decide whether the four-minute difference is worth the extra cost of the oil switch. This comparison is for interruptions caused by the blowing of high-tension fuses. In a properly designed substation the low-tension automatic switch will trip oftener than the high-tension fuse will blow, so that for most of the interruptions there are time-saving features with the oil switch. Probably for most cases the best proposition is the combination of quick-break fuse on the high-tension side and a cheap automatic oil switch on the low tension.

#### Prepayment Area in San Francisco

AN ACCOUNT was published on page 454 of the issue of this paper for March 8 of a prepayment area with six loop tracks, built by the United Railroads of San Francisco near the Union Iron Works in San Francisco to expedite the handling of the employees of that company. In the plan of the area published,



PLAN OF PREPAYMENT AREA IN SAN FRANCISCO

however, one of the tracks on Third street was omitted, so that a corrected drawing of the prepayment area is presented herewith.

Briefly, the arrangement of loops is such that south-bound cars move over the three inner loops while north-bound cars are loaded on the three outer loops. The capacity of the loops is thirty cars, allowing lanes between cars of width sufficient to afford easy access to the inner tracks. The cars move out of the yard on a twelve-second headway. The switches leading from the incoming track to the several loops are controlled by hand operation from the tower at the corner where the tracks enter the yard. The area measures 200 ft. x 273 ft.





ELABORATE PASSENGER STATION BUILT BY REAL ESTATE PROMOTERS ON LINE OF PACIFIC ELECTRIC RAILWAY

## Shelters and Stations on Pacific Electric's Interurban Lines

The Author Gives Construction Details of a New Type of Shelter Used on the Pacific Coast and Tells of the Conditions Under Which Shelters and Stations Are Provided

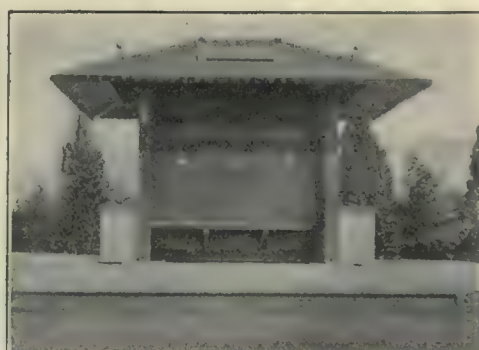
By CLIFFORD A. ELLIOTT

Cost Engineer Maintenance of Way Department, Pacific Electric Railway,  
Los Angeles, Cal.

SINCE the construction of its line in 1902 the Pacific Electric Railway has placed small waiting shelters of various types at numerous stops on its interurban lines. Many of these were erected because specified in right-of-way contracts, while others were provided on account of traffic requirements. Usually the persons from whom rights-of-way were secured favored some particular type of station used by the company elsewhere on its line, or they favored a type, such as the mission type so extensively used in southern California, in keeping with the architectural style prevalent in the neighborhood.

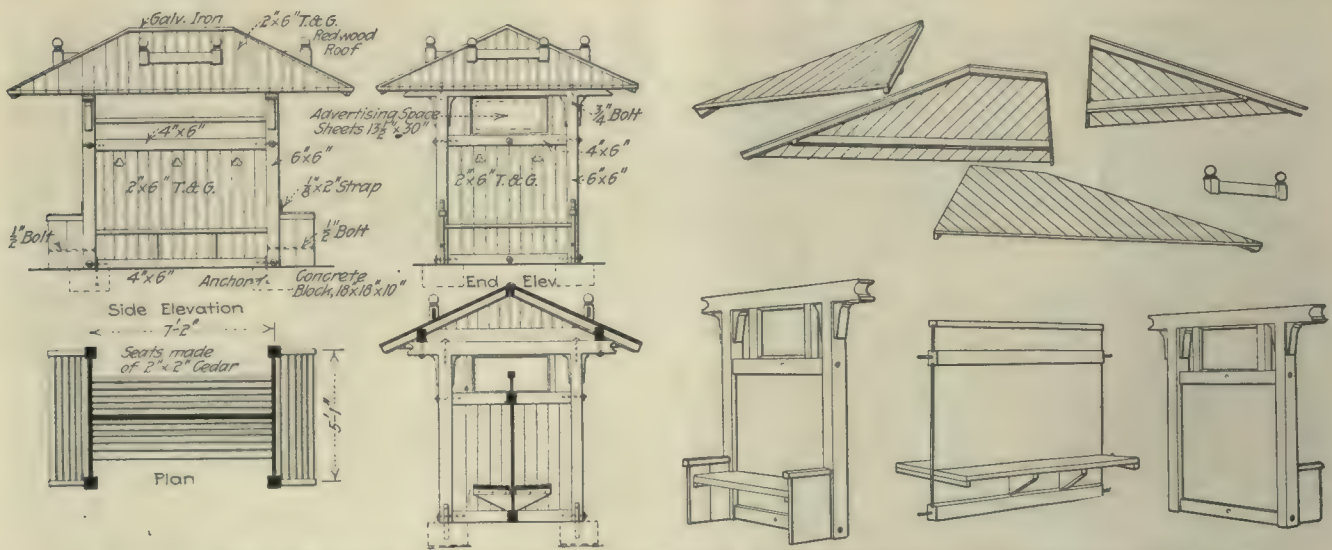
The company has made it a policy to discharge its obligations to the traveling public by erecting commodious waiting shelters at important junction points

whenever the travel warrants so doing. No contributions toward the expense of such shelters are sought from near-by residents, the company depending upon traffic checks to determine when and where shelters are needed. However, a consistent policy must be followed in this matter because, in addition to important junction stops on the line, there are more than 1000 minor stops. The company has established a fixed policy, therefore, that when patrons in the vicinity of such a stop petition for the erection of a shelter, the committee of petitioners, usually numbering from fifty to 100 patrons, is expected to contribute one-half the cost of the shelter. The committee is required to deposit this amount in advance of construction of the station. All shelters constructed at the joint expense of the patrons



TWO OUTER VIEWS, PASSENGER WAITING SHELTERS OF FRAME CONSTRUCTION TYPE ON PACIFIC ELECTRIC RAILWAY INTERURBAN LINES; CENTER VIEW, UNIT-SLAB CONCRETE WAITING STATION FORMERLY USED BY THE COMPANY





DETAILS OF NEW FRAME CONSTRUCTION PASSENGER SHELTER SHOWING CONSTRUCTION OF UNITS

and the railway company are maintained by the railway company.

Recently the company adopted a new ornamental type of small waiting shelter, as shown in an accompanying illustration. The public has been well pleased with this, and its cost is moderate. Six shelters of this type have been erected to date, in two cases the local patrons providing one-half the cost and in four the company erecting the shelters to meet right-of-way obligations or traffic requirements. These shelters are made up of units which are constructed in the shop so that they can be turned out in quantities, a procedure which results in reducing first cost and providing a stock of parts available for prompt shipping to a selected location. Such promptness is especially desirable when patrons have contributed toward the cost of the shelter. The accompanying drawings show clearly how the units are made up and assembled.

For four years prior to the adoption of the new type of station the company had been erecting its "Type E

No. 10" unit-slab concrete shelters. These were constructed under royalty contract with the Unit Construction Company of San Francisco, and the sets of concrete members constituting the shelters were cast at the railway company's bridge and building shop. Several complete sets were always cast ahead to meet demands. The concrete stations cost somewhat more than those of the later frame type, which feature, of course, is objectionable to patrons who pay part of the expense of construction.

NO GLASS WINDOWS ARE PROVIDED

In neither type of shelter described are there any glass windows, as climatic conditions do not make them necessary. This feature eliminates the window glass maintenance problem, which is one that cannot be solved satisfactorily because tramps and mischievous small boys find window glass in small stations to be an appealing target at which to throw stones. The company installs no electric lamps in its small shelters, unless the conditions are exceptional. When electric lamps are used two are placed inside and three on a pole outside. Maintenance expense and cost of power are so great as to render this station lighting very objectionable.

While I am discussing the subject of shelters it may not be out of place to mention briefly the more pretentious stations which are used on the company's lines at a few points. At several stops on the lines, during the years when real estate subdivision activities were at their height, real estate companies secured the approval of the railway for the erection of stations in the interest of the real estate developments. In two cases very elaborate stations were erected, and in type and size they were in advance of the traffic demands at the time they were constructed and made ample provision for the growth of the territory which they served. They were, however, constructed entirely at the expense of the real estate companies. The illustration shown at the head of this article made from an architect's drawing shows an artistic passenger waiting station erected at a cost of \$4,653 by the Lynwood Company, builders, owners and promoters of Lynwood townsite on the Santa Ana line of the company. This station was erected in 1917.

MATERIAL LIST FOR FRAME CONSTRUCTION OF PASSENGER SHELTER

Number	Size, Inches	Length, Ft. and In.	Dressed to, Inches	Location	Detail Number
1	4x6	6-10	3 1/2 x 5 1/2	Sill bottom.....	1
1	4x6	6-10	3 1/2 x 5 1/2	Sill top.....	2
4	4x6	4-8	3 1/2 x 5 1/2	Sill top and bottom.....	3
4	6x6	6-6	5 1/2 x 5 1/2	Posts.....	4
2	6x6	8-0	5 1/2 x 5 1/2	Caps.....	5
2	4x6	10-4	3 1/2 x 5 1/2	Plates.....	6
2	4x6	7-3	3 1/2 x 5 1/2	Plates.....	7
30	2x6	4-4	T. and G.*	Sides.....	8
7	2x6	4-4	T. and G.*	Sides.....	9
1	2x10	7-1 1/2	1 1/2 x 9 1/2	Sign.....	10
1	3x3	7-1 1/2	2 1/2 x 2 1/2	Sign.....	10
4	3x3	1-6	2 1/2 x 2 1/2	Seat ends.....	10
15	1x6	1-6	T. and G.*	Floor.....	
4	1	10-0	Quarter round	Advertising boards.....	
8	4x4	1-2	Brackets	Advertising boards.....	
32	2x6	12-0	T. and G.*	Brackets.....	11
2	2x3	8	1 1/2 x 2 1/2	Redwood Roof.....	12
2	2x3	4	1 1/2 x 2 1/2	Hip rafters.....	13
8	4x4	1-2	Turned	Ridge.....	13
4	2x6	2-6	1 1/2 x 5 1/2	Roof signs.....	14
4	3x3	1-6	2 1/2 x 2 1/2	Roof signs.....	
8	2x8	2-0	1 1/2 x 7 1/2	Advertising signs.....	
8	2x3	1-6	1 1/2 x 2 1/2	Seat ends.....	
6	2x10	1-6	Sawed	Cleats under seats.....	
12	2x3	7-0 1/2	.....	Brackets under seats.....	
24	2x3	4-11 1/2	.....	White cedar seats.....	16
4	1	12	.....	White cedar seats.....	16
16	14	.....	.....	.....	
24	.....	.....	.....	.....	
8	.....	.....	.....	.....	
4	.....	.....	.....	.....	

\*Tongued and grooved.



London Publicity on Rules of Conduct in Traveling

IN THE PAST the publicity of the Underground Railways and the London General Omnibus Company has been notable for its ability to create travel. During the past four years, with the shortage of men and materials, the burning question has been how to handle a greatly increased travel with more safety and dispatch.

For this reason the advertising department of these companies has been giving its energies to preparing publicity that will be as effective in accelerating travel and promoting safety as the other publicity was effective in building custom.

For this work no color has been used other than tinted backgrounds for the station posters, but in accord with its policy the management has continued to employ high-class artists. Thus two of the series ema-



These views illustrate rules of conduct for travel on buses

**DO NOT ATTEMPT TO ENTER A CROWDED CAR**



Trains are delayed by Passengers trying to force their way into a full train. The more trains, the more seats. The shorter the stop at the station, the more trains.



**Train delays mean overcrowding**

**PASSENGERS OFF THE CAR FIRST, PLEASE**



First—When one gets out another can get in. Second—Those that would get in before, block the way of those that would get out. So to secure room and save seconds there can be no other rule

**PASS DOWN THE PLATFORM**



There are four, five, or six cars to a train. There are two gates to a car, and sometimes three. Two passengers cannot get through the same gate at the same time, but they can get through different gates at the same time. Even loading means quicker loading.



**Train delays mean overcrowding.**

**HURRY OFF PLEASE**




The train service cannot be hurried unless passengers are hurried. Every unnecessary moment that a train stands at a platform means just as many moments delay to all the trains following it.



**Train delays mean overcrowding.**

Three posters designed to shorten station stops on the Underground Railway




**THIS IS THE DEVIL-MAY-CARE FELLOW**

**BE READY FOR HIM**

HE CUTS OUT from behind anything stationary, more especially from behind trams or buses. There is no reason why he should not see if the road is clear first. He simply doesn't

THE DRIVERS MAY HOOT THE BRAKES BE PUT ON, EVERY CARE TAKEN, BUT—



**THIS IS THE HUSTLE-WITHOUT-CAUTION FELLOW**

**BE WARY**

HE IS FOUND everywhere, particularly on the surface at busy centres when he might be crossing in safety by the subways

THE DRIVERS MAY HOOT THE BRAKES BE PUT ON, EVERY CARE TAKEN, BUT—



**THIS IS THE SAVE-A-SECOND FELLOW**

**LOOK OUT EVERYONE**

HE HASN'T time to look to the right or to the left, but just darts out into the traffic, taking the risk of accident

THE DRIVERS MAY HOOT. THE BRAKES BE PUT ON, EVERY CARE TAKEN, BUT—

Cautions to the careless pedestrian when crossing streets



nate from a regular artist of *Punch*, the famous humorous weekly, and the pictures have just that element of native wit that attracts the passenger's attention without reprobation. As a matter of fact, the poster entitled "Do Not Attempt to Enter a Crowded Car" satirizes the artist himself! The other pictures in the station poster series are: "Passengers Off the Car First, Please"; "Hurry Off, Please"; and "Pass Right Down the Car, Please." The artist who drew the station posters is also responsible for the accompanying half-dozen sketches relating to rules of conduct for travel on buses. These drawings appear in newspaper advertisements.

Another ingenious series is that of the different kinds of "fellows"—the avoid-the-light, save-a-second, absent-minded, hustle-without-caution, hustle-without-aim and the devil-may-care varieties.

## C. E. R. A. Committees Appointed

### New "Brown Book" of Central Electric Railway Association and Allied Bodies Just Issued

"BROWN BOOK NO. 9" of the Central Electric Railway Association has just been published. It gives the officers for 1919, already noted in this paper in connection with the annual February meeting of the association; the president's address and the report of the secretary-treasurer, copies of various bulletins, committee appointments and other matters of local interest. The personnel of the various committees follows:

#### CENTRAL ELECTRIC RAILWAY ASSOCIATION

**Auditing**—Walter Shroyer, Anderson, Ind., chairman; L. T. Hixson, Indianapolis, Ind., and E. O. Reed, Lima, Ohio.

**Annual Transportation**—H. A. Nicholl, Anderson, Ind., chairman; S. W. Greenland, Fort Wayne, Ind.; C. K. Minary, Benton Harbor, Mich.; C. J. Laney, Akron, Ohio, and C. O. Sullivan, Lima, Ohio.

**Bureau of Standards**—Adolph Schlesinger, Indianapolis, Ind., chairman; G. H. Kelsay, Cleveland, Ohio; L. G. Tighe, Akron, Ohio; M. J. Kehoe, Springfield, Ohio; E. J. Burdick, Detroit, Mich., and Prof. D. D. Ewing, Purdue University.

**Constitution and By-laws**—A. W. Brady, Anderson, Ind., chairman; C. L. Henry, Indianapolis, Ind.; E. F. Schneider, Cleveland, Ohio; J. F. Collins, Jackson, Mich., and A. C. Blinn, Akron, Ohio.

**Finance**—F. D. Carpenter, Lima, Ohio, chairman; W. H. Forse, Jr., Anderson, Ind.; F. R. Coates, Toledo, Ohio; Harry Reid, Indianapolis, Ind., and T. A. Ferneling, Dayton, Ohio.

**Hotel and Arrangement**—S. D. Hutchins, Wilmerding, Pa., chairman; H. A. Nicholl, Anderson, Ind.; L. G. Parker, Cleveland, Ohio; F. R. Coates, Toledo, Ohio; John Benham, Chicago, Ill.; James H. Drew, Indianapolis, Ind.; H. E. Rasmussen, Indianapolis, Ind.

**Interurban Freight and Motor Truck Competition**—A. Swartz, Toledo, Ohio; chairman. Indiana: Bert Weedon, Indianapolis, Ind., chairman; J. A. Greenland, Fort Wayne, Ind., and James H. Drew, Indianapolis, Ind. Michigan: W. S. Rodger, Detroit, Mich., chairman; F. W. Brown, Grand Rapids, Mich., and F. N. Root, Kalamazoo, Mich. Ohio: F. R. Coates, Toledo, Ohio, chairman; E. F. Schneider, Cleveland, Ohio, and S. D. Hutchins, Wilmerding, Pa.

**Membership**—John Witt, Cleveland, Ohio, chairman;

J. M. Enright, Toledo, Ohio; S. W. Greenland, Fort Wayne, Ind.; Harry Reid, Indianapolis, Ind.; C. F. Smith, Findlay, Ohio; R. A. Crume, Dayton, Ohio; J. B. Stewart, Jr., Youngstown, Ohio, and W. H. Douglas, Willoughby, Ohio.

**Program**—C. L. Henry, Indianapolis, Ind., chairman; R. T. Sullivan, Youngstown, Ohio; F. D. Carpenter, Lima, Ohio; W. H. Bloss, Mansfield, Ohio; H. G. Gilpin, Springfield, Ohio; W. S. Rodger, Detroit, Mich., and W. K. Morley, Grand Rapids, Mich.

**Publicity**—E. R. Kelsay, Toledo, Ohio, chairman; H. F. Kenfield, Chicago, Ill., and C. J. Laney, Akron, Ohio.

**Readjustment**—C. L. Henry, Indianapolis, Ind., chairman; W. S. Rodger, Detroit, Mich.; A. C. Blinn, Akron, Ohio; J. A. Van Osdol, Anderson, Ind.; W. K. Morley, Grand Rapids, Mich.; W. S. Whitney, Springfield, Ohio; Harry Reid, Indianapolis, Ind.; W. H. Bloss, Mansfield, Ohio, and L. E. Gould, Chicago, Ill.

**Resolutions**—A. W. Brady, Anderson, Ind., chairman; F. D. Carpenter, Lima, Ohio, and A. C. Blinn, Akron, Ohio.

**Rules Governing Interchange of Equipment**—H. A. Nicholl, Anderson, Ind., chairman; Harry Bullen, Detroit, Mich.; A. Swartz, Toledo, Ohio, and J. W. Glendenning, Jackson, Mich.

**Standardization**—R. C. Taylor, Albion, Mich., chairman; H. H. Buckman, New Albany, Md.; F. J. Foote, Springfield, Ohio; Charles Sigler, Warsaw, Md.; F. Heckler, Fremont, Ohio; W. E. Ralston, Michigan City, Ind.; Terrence Scullen, Cleveland, Ohio; S. Potter, Detroit, Mich.; C. A. Brown, Toledo, Ohio, and K. A. Simmons, Pittsburgh, Pa.

**Uniform Charges for Repairs to Interchanged Equipment**—H. G. Gilpin, Springfield, Ohio, chairman; Irwin Fullerton, Detroit, Mich., and S. R. Dunbar, Anderson, Ind.

**Supply Men**—S. D. Hutchins, Wilmerding, Pa., chairman; L. G. Parker, Cleveland, Ohio; W. H. Bloss, Mansfield, Ohio; L. E. Gould, Chicago, Ill.; E. C. Price, Springfield, Ohio; J. Alexander Navarre, Minneapolis, Minn.; E. C. Folsom, Chicago, Ill.; S. W. Crawford, St. Louis, Mo.; H. C. Decamp, East Pittsburgh, Pa.; E. F. Wickwire, Mansfield, Ohio; F. N. Root, Kalamazoo, Mich., and E. J. Smith, Detroit, Mich.

**Transportation**—G. K. Jeffries, Indianapolis, Ind., chairman; E. Smith, Fostoria, Ohio; H. G. Gilpin, Springfield, Ohio; C. E. Morgan, Grand Rapids, Mich.; J. F. Keys, Detroit, Mich.; J. C. Schade, Warsaw, Ind.; C. C. Collins, Cleveland, Ohio; W. K. Morley, Grand Rapids, Mich., and R. R. Smith, South Bend, Ind.

**Track and Roadway**—T. R. H. Daniels, Indianapolis, Ind., chairman; T. H. Sundmaker, Springfield, Ohio; John Kerwin, Detroit, Mich.; L. A. Mitchell, Anderson, Ind.; A. V. Brown, Sandusky, Ohio; H. D. Sanderson, Jackson, Mich., and W. F. Carr, South Bend, Ind.

#### CENTRAL ELECTRIC RAILWAY TRAFFIC ASSOCIATION

**Standing Auditing**—Walter Shroyer, Anderson, Ind., chairman; L. T. Hixson, Indianapolis, Ind., and E. O. Reed, Lima, Ohio.

**Booster**—F. D. Norveil, Anderson, Ind., chairman; C. O. Sullivan, Lima, Ohio; J. H. Crall, Indianapolis, Ind.; O. H. Murlin, Dayton, Ohio, and J. H. Pound, Benton Harbor, Mich.

**Conference**—F. D. Norveil, Anderson, Ind., chairman; C. O. Sullivan, Lima, Ohio, and J. A. Greenland, Fort Wayne, Ind.



*Conference with Central Freight Association and Central Passenger Association*—J. H. Pound, Benton Harbor, Mich., chairman; F. D. Norveil, Anderson, Ind.; W. S. Whitney, Springfield, Ohio; C. O. Sullivan, Lima, Ohio, and J. H. Crall, Indianapolis, Ind.

*Constitution and By-Laws*—C. J. Laney, Akron, Ohio, chairman; Bert Weedon, Indianapolis, Ind.; E. Hamprecht, Findlay, Ohio; James Rollins, Evansville, Ind., and J. F. Keys, Detroit, Mich.

*Freight Rates*—F. D. Norveil, Anderson, Ind., chairman; J. S. Moore, South Bend, Ind.; W. S. Whitney, Springfield, Ohio; C. C. Collins, Cleveland, Ohio; N. Rumney, Detroit, Mich.; Bert Weedon, Indianapolis, Ind., and C. J. Laney, Akron, Ohio.

*Interchangeable Penny Coupon Ticket*—W. S. Whitney, Springfield, Ohio, chairman; O. H. Murlin, Dayton, Ohio, and J. H. Crall, Indianapolis, Ind.

*Interline Baggage*—O. H. Murlin, Dayton, Ohio, chairman; C. O. Sullivan, Lima, Ohio; J. A. Greenland, Fort Wayne, Ind.; J. F. Keys, Detroit, Mich., and J. O. Motto, Warsaw, Ind.

*Joint Passenger Tariffs*—W. S. Whitney, Springfield, Ohio, chairman; F. D. Norveil, Anderson, Ind.; J. F. Starkey, Sandusky, Ohio; J. H. Crall, Indianapolis, Ind., and J. F. Keys, Detroit, Mich.

*Joint Freight Tariffs*—J. H. Pound, Benton Harbor, Mich., chairman; H. R. Biery, Scottsburg, Ind.; C. B. Kleinhans, Toledo, Ohio; C. C. Collins, Cleveland, Ohio, and J. O. Bradfield, Columbus, Ohio.

*Military Traffic*—F. D. Norveil, Anderson, Ind., chairman; W. S. Whitney, Springfield, Ohio; J. H. Pound, Benton Harbor, Mich.; C. O. Sullivan, Lima, Ohio, and J. H. Crall, Indianapolis, Ind.

*Official Classification*—W. S. Whitney, Springfield, Ohio, chairman; J. A. Greenland, Fort Wayne, Ind.; N. Rumney, Detroit, Mich.; F. D. Norveil, Anderson, Ind., and C. J. Laney, Akron, Ohio.

*Joint Exception Tariff*—G. O. Sullivan, Lima, Ohio, chairman; J. H. Crall, Indianapolis, Ind.; H. R. Biery, Scottsburg, Ind.; G. M. Patterson, Kendallville, Ind.; J. H. Pound, Benton Harbor, Mich.; W. S. Whitney, Springfield, Ohio, and F. D. Norveil, Anderson, Ind.

*Joint Weight and Inspection Bureau*—J. H. Crall, Indianapolis, Ind., chairman; F. D. Norveil, Anderson, Ind.; W. S. Whitney, Springfield, Ohio; O. H. Murlin, Dayton, Ohio; N. Rumney, Detroit, Mich.; C. P. Ryan, Kokomo, Ind., and F. W. Brown, Grand Rapids, Mich.

*Official Interurban Map*—G. M. Patterson, Kendallville, Ind., chairman; J. H. Crall, Indianapolis, Ind.; O. H. Murlin, Dayton, Ohio; W. S. Whitney, Springfield, Ohio, and J. H. Pound, Benton Harbor, Mich.

*Official Interurban Guide*—C. O. Sullivan, Lima, Ohio, chairman; J. H. Crall, Indianapolis, Ind.; F. D. Norveil, Anderson, Ind.; J. F. Starkey, Sandusky, Ohio, and J. A. Greenland, Fort Wayne, Ind.

*Rules Governing Settlement of Freight Claims*—F. D. Norveil, Anderson, Ind.; chairman; J. S. Moore, South Bend, Ind.; J. S. Clark, Bluffton, Ind.; C. B. Kleinhans, Toledo, Ohio; C. O. Sullivan, Springfield, Ohio; N. Rumney, Detroit, Mich., and C. J. Laney, Akron, Ohio.

*Storage and Demurrage*—C. O. Sullivan, Springfield, Ohio, chairman; J. A. Greenland, Fort Wayne, Ind.; N. Rumney, Detroit, Mich.; Bert Weedon, Indianapolis, Ind., and E. Hamprecht, Findlay, Ohio.

**CENTRAL ELECTRIC RAILWAY ACCOUNTANTS' ASSOCIATION**  
*Compiling*—L. T. Hixson, Indianapolis, Ind., chairman; I. E. Guthrie, Indianapolis, Ind.; H. F. McColgin,

Scottsburg, Ind.; A. R. Baxter, Indianapolis, Ind., and A. L. Neereamer, Indianapolis, Ind.

*Constitution and By-Laws*—A. R. Baxter, Indianapolis, Ind., chairman; O. A. Small, South Bend, Ind., and J. P. Longon, Dayton, Ohio.

*Freight and Excess*—Walter Shroyer, Indianapolis, Ind., chairman; L. W. Van Bibber, Springfield, Ohio, and James Sweeney, Akron, Ohio.

*Light and Power*—H. T. Ledbetter, Toledo, Ohio, chairman; James Sweeney, Akron, Ohio; K. A. George, Kokomo, Ind.; H. E. Vordermark, Fort Wayne, Ind., and J. S. Minary, Benton Harbor, Mich.

*Membership*—O. A. Small, South Bend, Ind., chairman; C. B. Baker, Findlay, Ohio, and J. F. Stratton, New Albany, Ind.

*Program and Arrangement*—E. O. Reed, Lima, Ohio, chairman; J. B. Hooper, Detroit, Mich., and G. H. Wilson, Evansville, Ind.

*Readjustment*—W. H. Forse, Jr., Indianapolis, Ind., chairman; J. P. Longon, Dayton, Ohio, and G. B. Dobbin, Akron, Ohio.

### Steel Body Electric Locomotive Rebuilt

THE Georgia Railway & Power Company has recently built a new steel-body steeple-type locomotive in its shops to haul coal cars from the steam railroad to its Davis Street power plant. The body was rebuilt from a motor car and the electrical equipment and trucks are the same as previously used. The loco-



LOCOMOTIVE HAULING A LOADED COAL CAR

otive has four GE-1000 motors with 15:69 gear ratio mounted on Peckham trucks. One K-35-G controller is used. The air brakes are Westinghouse type AMM with a 12-in. brake cylinder. The locomotive is equipped with Janney couplers and Golden Glow headlights. The total weight is 45,000 lb. The accompanying table gives some of the principal dimensions:

Length of body .....	34 ft. 0 in.
Width of body .....	8 ft. 2 in.
Height over all .....	12 ft. 8 in.
Bolster centers .....	17 ft. 6 in.
Wheelbase .....	4 ft. 0 in.
Wheels .....	Cast iron; 33-in. diameter; 3-in. tread; 4-in. axles.

The theory of commission regulation is well understood. Utilities, as well as the public, must be protected. The law permits them a fair return upon the value of their property. The obligation to increase a rate when it is shown to be too low is as imperative as it is to decrease a rate when it is too high.



# An Optimistic Talk on Street Railways

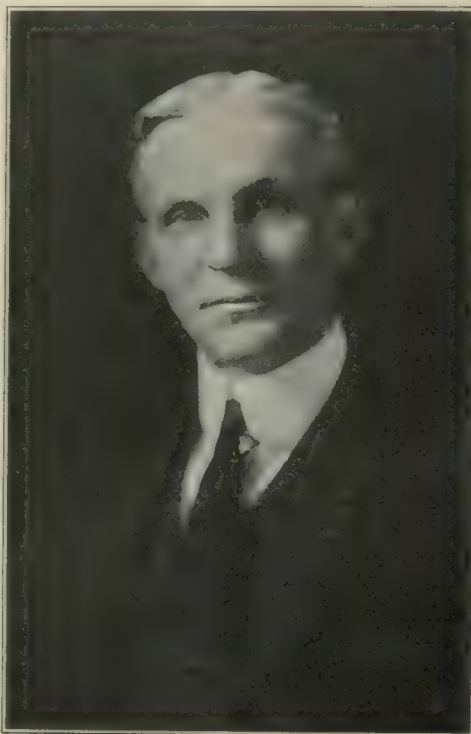
## by Henry Ford

*From an Interview  
with an ELECTRIC RAILWAY JOURNAL representative,  
April 9, 1919*

**E**LECTRIC railway men who have been bewailing the decline and early death of their industry should be shocked into a joyous frame of mind when they are told that Henry Ford—yea, Henry Ford of all others—emphatically does not believe that the days of the railway are no more. Nay, further, he believes that the street railway, in particular, can be of greater usefulness in the immediate future than it ever was in the brightest days of the past.

But, and there is the rub—that greater usefulness cannot come, he says, until the industry flings traditional practices to the winds. The twofold absurdity of carrying five to ten times as much wood and iron as the weight of the passenger and of failing to give service and fares that would attract the vast number of pedestrians must stop. Although the railway field was not his specialty, he was going to prove at his own expense that it is possible, practicable and profitable to build a car that will hold the same relation to other street cars as the Ford for the millions does to the automobile for the thousands. This car will be so light that its fuel consumption on rails will be extremely low, and furthermore it will not require heavy expense for track construction and up-keep. Nor would this lightness be secured at the sacrifice of strength. Even automobile steel would not be good enough for him, because the steel which had been

developed for the Fordson tractor was still stronger. Why use a 4-in. or 5-in. axle when 2-in. of a better steel would serve; and so with the trucks, the wheels and other parts?



HENRY FORD

A light car meant frequent service; yet frequent service alone was not enough to develop the greatest possible travel. Let the user of such a car work on the maxim "Nobody Walks" by beginning with the lowest base fare possible. From what he had seen and learned Mr. Ford ventured to prophesy that street railway traffic would be doubled at least if short headways and low graduated fares went hand in hand. It was up to the street railway men to see that the service was so good and so cheap that the owner of the automobile would use street railway service

habitually instead of occasionally. Then the number of railway cars would rise from a hundred thousand to a quarter million or more.

Although the street car which Mr. Ford's staff is now developing is intended for direct gasoline drive, he saw no reason why the principle of using the strongest available materials should not be applied to cars with electric-motor drive.

The success already achieved with the one-man safety car surely bears out the sound sense of what Mr. Ford has to say on light weight and frequent service. In fact, he was amused to learn that the safety car had instinctively been nicknamed the "Ford of the Street Car Business."



# Detroit Refuses to Pay the Price

**Purchase of Detroit City Lines for \$31,500,000 Voted Down 70,271 Against 63,883 Despite Fact that Charter Calling for Municipal Ownership of Traction Lines Was Accepted at a Seven to One Vote in June, 1918—What Mayor Couzens and Other Prominent Detroiters Have to Say on the Causes of Rejection**

TO THE OUTSIDER who has watched the long-drawn-out struggle between the people and the street railway of Detroit to come to some settlement, the rejection of the latest purchase plan at the election of April 7 must have come as a great surprise. Perhaps in no other large city have so many prominent men of business forgotten their usual antagonism toward municipal ownership for the sake of ending an intolerable situation. The traction problem had been a political football so long that both sides were heartily tired of negotiation and counter-negotiation. Finally, the Detroit United Railway on the one side and the Mayor and Street Railway Commission on the other agreed on a compromise valuation of \$31,500,000, whereupon the voters of Detroit were asked to vote upon its acceptance or rejection.

Despite the strong sentiment for the municipal ownership of the street railway system, the election of Monday, April 7, not only failed to get the three-fifths vote necessary, but actually failed to win one-half of the votes cast, the "Nays" numbering 70,271 and "Yeas" 63,883. In view of the importance of the election, the ELECTRIC RAILWAY JOURNAL had already sent one of its representatives to Detroit to interview Mayor Couzens and others on the meaning of the people's decision whichever way the election should turn out.

## MAYOR COUZENS SOUGHT A BUSINESS MAN'S SETTLEMENT

When seen on April 8, the day following the election, Mayor Couzens did not hesitate to express disappointment at the rejection of the compromise valuation. It was true that during the past decade or more every plan offered had been negated at the polls. Nevertheless, he had hoped that the education in working together for general social betterment, promoted by the war, would manifest itself in the desire of the people of Detroit to examine the basis of the traction settlement in a broad way regardless of politics and prejudices. There seemed to be all the more reason for this expectation because the people had accepted by the overwhelming ratio of seven to one a new charter in June of last year, by which the forty-two-member board of estimate and council and the twenty-one-member board of education had been replaced by much smaller bodies, and by which charter also so much power had been centered in the mayor that actually even the tax rates were up to him. Beyond all this, the charter made street railway ownership and operation mandatory. His Honor did not assert that the price was the very lowest that might possibly be obtained, but if he had been negotiating in private business under the same circumstances he certainly would believe that it was worth a couple million dollars to settle on a compromise basis. It surely would be worth this money to get rid of what had been for so long the stumbling block in Detroit politics—the street railway system.

One criticism that the mayor had to offer of the Detroit United Railway was that it knew very well that its franchises would expire after thirty years. Therefore, its policy toward the public should have taken this fact into consideration. The company could hardly expect to receive any high price for its property because property on leased ground certainly was not as valuable as property on land owned in fee.

In conclusion the mayor said that he was not prepared to express himself as to the next move. He wanted time to reflect as to what was the best course of action in the interests of the public.

## OTTO KIRCHNER ANALYZES DIVERSITY OF OPPOSITION VOTE

Otto Kirchner, former Attorney General of the State of Michigan, who drew up the traction agreement as counsel for the city administration, pointed out that the vote against the purchase was an anti-municipal-ownership vote only in small part. The general public felt that it had not been treated right by the Detroit United Railway and its predecessors. After litigation on almost every request made by the city, they had come to the conclusion that it was useless to do anything that would make the railway under private management a permanent institution. The result was that the larger part of the company's franchises within the city limits had expired by limitation except the 3-cent lines, and even these would go in 1923. Therefore, the company had no vested rights but was simply occupying the streets on sufferance because the city had nothing apparently with which to secure the same transportation facilities quickly.

Aside from the presumably small number of people opposed to municipal ownership as a matter of principle, regardless of circumstances, the opposition had recruited many votes from people who were opposed to practically anything that gave a seeming concession to the Detroit United Railway. The average man who owned little or no property would not understand that there could be a difference of several million dollars between the valuations reached by the experts of the opposing sides. Yet the difference in so large a transaction really was comparatively so small that even the compromise figures could be considered low. Mr. Kirchner thought the Detroit commissioners had acted like business men rather than politicians. Another large element that was in evidence was composed of voters who lived along the 3-cent lines and others who were getting the eight-for-twenty-five-cent workmen's tickets. These voters feared that they would have to pay a higher fare as soon as the city took over the lines. There was also an exaggerated and erroneous idea concerning the privilege of the Detroit United Railway interurban lines to come in over the municipalized tracks. In the first place, the Michigan Railroad Commission would have had the right to com-



pel the city to permit the interurban cars to come into town instead of dumping their passengers at the city limits. In the second place, the interurban cars ought to be welcomed into the city because they were an important source of Detroit's business prosperity. In the third place, the agreement did not permit the company to do any purely city business and it would have been obliged to pay actual cost plus 30 per cent for the privilege of running over the city tracks. Mr. Kirchner also believed that, while the measure was wholly non-partisan, many politicians had fought the purchase because they were not willing that Mr. Couzens should have the credit of having solved the street railway problem.

In view of the fact that the Detroit United Railway was now on the streets largely through sufferance, it had no vested rights such as might be claimed for a street railway with actual franchises. Therefore it was entirely proper, in his opinion, for the city to have competitive services. The idea of piecemeal construction of an opposition street railway was impracticable, but the suggestion had been made that a number of motor buses be installed on certain streets or parallel to them where traffic conditions were most in need of relief. In fact, R. W. Meade, formerly of the Fifth Avenue Coach Company of New York, was already trying to arrange for such service.

#### ELEMENTS OF OPPOSITION AS SET FORTH BY DAVID A. BROWN

To determine the opinions of some representative business man widely known for his civic patriotism, the ELECTRIC RAILWAY JOURNAL representative called upon David A. Brown, president General Ice Delivery Company. Mr. Brown's analysis of the opposing vote covered the five reasons following in the order of their importance.

1—Many people feared that the city was not committing itself merely to an expenditure of \$31,500,000, but to an eventual outlay of double or triple that amount, which would mean heavy increases in taxes. This fear was all the more justified by the fact that the voters were also asked to (and did) approve other large expenditures for public purposes at this election.

2—Others had the impression that the city was being asked to pay too much money for worn-out or partially obsolete equipment.

3—Still others feared that municipal ownership would deprive them of exceptionally low fares.

4—Some did not want to approve an arrangement that gave the Detroit United Railway perpetual rights for the entrance of interurban cars.

5—Finally, the decision of a number of voters had been affected by Henry Ford's announcement that he was working upon a gas-drive car that would make much electrical equipment out of date.

The interview concluded with a heart-to-heart talk with one of the officials of the Detroit United Railway. This official has been with the com-

pany for many years, and like many of his co-workers he has shown his faith in Detroit by investing all his savings there. He stated that when the present administration took over the property nearly a quarter century ago it inherited a number of perplexing and trouble-breeding problems. Many efforts had been made to solve them, but it seemed simply inevitable that the Detroit United Railway was deemed to remain a "houn' dog" to be kicked around by every selfish politician looking for a sure-fire issue.

As to the election just past, no other course than patient waiting was open to the company. It had agreed to a compromise that did not allow a cent for going concern and the like. Following this there was nothing more to do than to await and abide the will of the people. He was sure that Mayor Couzens and the Board of Street Railway Commissioners had worked earnestly and sincerely, for the best interest of the city, even if he did believe that the property was worth more than they did.

There surely were many directions in which Detroit's electric railway service could be improved, especially re-routing, but what bankers would loan money in the present uncertain state of the company's future? As a Detroitier proud of his city's growth, he felt this choking down of its essential transportation facilities even more keenly than he did as a railway operator.

### The Mountain or the Molehill?

IN A RECENT series of newspaper advertisements the Springfield (Ill.) Consolidated Railway has brought out in an unusually striking way the moderation of electric railway pleas for adequate revenues and the comparatively small effect the payment of a just fare would have upon the public.

According to one set of nine advertisements the public in order to get real relief from high cost burdens

## If Electric Service, Gas and Street Car Rides Were Free

If all the service of all the gas and electric and street railway companies of the United States were furnished the public free of all charge, it would not make any great difference to the financial burdens of the average citizen—nothing like the difference that the average citizen supposes.

For, surprising as it may seem to the aforesaid average citizen, only 2½ per cent (25¢ per cent to be exact) of his living expenses goes for gas, electric service and street railway transportation.

The national industries conference board and other official and semi-official bodies which have been investigating the high cost of living, recently have presented some interesting figures, showing just where your dollars go.

They find that, of each dollar paid out by the average American for ordinary expenses:

42.1 cents go for food.  
18.4 cents go for sundries.  
17.2 cents go for rent and taxes.  
13.2 cents go for clothing.  
5.1 cents go for coal.  
2.5 cents go for gas, electricity and street railways.

It is worthy of note, too, that the big percentages of increased costs during the last five years have been in those items which take most of the money of the average worker. Food has advanced 82 per cent since 1914. Sundries have advanced 56 per cent. Rent has advanced 10 to 20 per cent and taxes 67 per cent. Clothing has advanced 82 per cent and coal 68 per cent.

On the other hand, there have been but fractional advances in gas, electric service and street railway rides, and, in every instance, these advances have been much smaller than the added costs that the utility companies have had to meet in order to give public service.

Springfield Gas and Electric Company  
Springfield Consolidated Railway Company  
A. D. MACKIE, General Manager.

## Private Versus Public Operation

While wartime conditions have necessitated increased rates in all lines of service, whether publicly or privately operated, privately operated concerns, such as ourselves, will not suffer by a just comparison of such rate increases.

In Springfield, the rates for 1914 (just before the war started), and those now prevailing, together with the percentages of increase, are as follows:

### UNDER PUBLIC OPERATION

Character of service	Rate in 1914	Rate in 1919	Percentage of increase
City government	\$1.00	\$2.00	75%
State government	.48	.75	56%
Postage (outside)	.22	.30	60%
Steam railways	.22	.30	40%
Freight carrying	.22	.30	38%
Public schools	2.17	2.80	28%
Express service	.10	.13	30%
Township government	.20	.26	30%
County government	.20	.26	30%

### UNDER PRIVATE OPERATION

Character of service	Rate in 1914	Rate in 1919	Percentage of increase
Steam heat	Flat rate	Motor rate	25%
Hot water heat	.20	.25	25%
Street car rides	.20	.25	25%
Gas	1.00	1.25	25%
Electric lighting	.20	.25	25%

The average increase in rates under public operation was 44 per cent. The average increase in rates under private operation was only 19 per cent.

Springfield Gas and Electric Company  
Springfield Consolidated Railway Co.  
A. D. Mackie, General Manager.



should seek relief from the 97.5 cents which it spends out of every dollar for food, clothing, taxes, etc., rather than from the 2.5 cents which it pays out for gas, electricity and street car fares.

Thoughtless persons, it was said, may be persuaded to mistake the molehill for the mountain. Thoughtful persons, however, will hardly permit themselves to be deceived as to the needs of the electric railways, for these carriers want no more relief than governmental divisions and publicly operated concerns have taken.

The second series of eighteen advertisements was printed in a uniform size of type, beginning "Do you know" and in most cases ending with "Suppose you check the figures by your own bills." They emphasized such points as this:

Do you know that the U. S. Government says that it now costs \$16.59 to buy as much living necessities as \$10.00 would buy five years ago and that, of this \$6.59 increase on each \$10.00 of living expensess, only 11 cents have gone for gas, electricity and street railway rides! Why not check the figures by your own bills!

## Can Effect of Fare Increase Be Predicted?

Relation of Stable to Unstable Traffic Determines Limits Between Which Fare Increase Will Result in Revenue Increase

BY C. E. SCHUTT

Engineer Krehbiel Company, Chicago, Ill.

**R**EPORTS by electric railway companies of the increase in revenue derived from increased fares indicate that these companies have a difficult situation confronting them in that the increase in revenue has not been as great as expected and that there seems to

to fall and thereby to furnish a basis for estimates, from which adjustments can be made as experience is gained. Such a plan is outlined in this article which it is hoped may prove suggestive in furnishing a basis for calculations which will give results more nearly consistent than those heretofore obtained.

If 100 per cent of the street car travel in a given city were a necessity to the patrons, *i.e.*, if it were necessary that 100 per cent of the patrons use that means of going to and from work, a change in fare would result in an immediate proportional change in revenue. If on the other hand the car service could be used at will by the patrons, there would be an immediate decrease in travel following an increase in rates. Obviously, then, an electric railway company sells a necessity to those who must use the cars, and a convenience or a luxury to those who may or may not use the cars as they choose. It is the latter class of service that produces a portion of the income most difficult to estimate under conditions of changing fares. These two classes of traffic will be referred to hereafter as stable and unstable traffic.

The stable or necessary traffic may be assumed to produce an immediate increase in revenue in proportion to the increase in rate of fare. Ultimately, however, we should expect some reduction in the number of fares due to readjustment of industry and living if it were found necessary unduly to increase rates to meet operating expenses.

The unstable traffic cannot be expected to show increased revenue proportional to a fare increase on account of a natural decrease in travel. Optimistically we may expect that the revenue from this class of traffic will remain substantially the same within reasonable limits of fare change. This will give a basis for estimating the maximum expectation. The lower limit

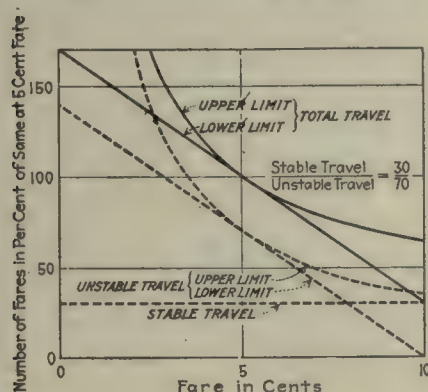


Fig. 1

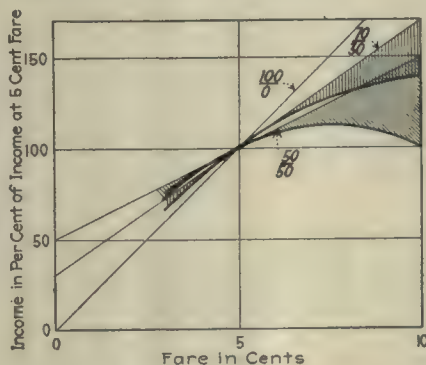


Fig. 2

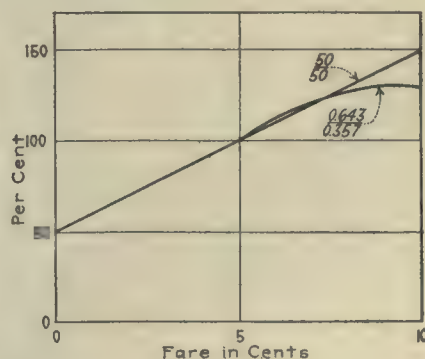


Fig. 3

DIAGRAMS SHOWING EFFECTS OF INCREASES IN ELECTRIC RAILWAY FARES

be no way of telling in advance even approximately what the amount of increase in revenue will be.

It is customary to speak of the theoretical or possible per cent increase in revenue as directly proportional to the increase in rate of fare. Of course such an increase in revenue cannot be considered as probable nor even within the range of expectation, since it would be based on the assumption that the number of fares would not be effected by increasing the rate of fare. It has been the general experience that the number of fares has been very materially decreased by an increase in fare.

This situation presents an interesting problem which unlike engineering problems is not susceptible of exact mathematical solution, but it is possible to determine certain limits between which we may expect results

of expectation from unstable traffic may be estimated conservatively by assuming that doubling the fare will cut traffic practically to zero while giving free rides will double the traffic, with corresponding effects in between. This lower limit will represent more nearly the immediate expectation while the upper limit will represent the ultimate expectation for increase in revenue from unstable traffic after it has become adjusted to and accustomed to increased fares.

On the above basis some curves have been worked out and are shown here. Fig. 1 shows, in per cent of travel at a five-cent fare, the upper and the lower limits of total travel when 30:70 is the ratio of stable to unstable traffic. Fig. 2 shows the upper and lower limits of expectancy in revenue increase (or decrease)



—At 5 Cents—		Per Cent In- crease in Fare	Total Number of Fares in per Cent of Number at 5 Cents		Total Income in per Cent of Increase at 5 Cents		Per Cent Increase in Revenue	
Stable Traffic per Cent of Whole	Un- stable Traffic per Cent of Whole		Upper Limit	Lower Limit	Upper Limit	Lower Limit	Upper	Lower
100	0							
		-40	100	100	60	60	-40	-40
		-20	100	100	80	80	-20	-20
		0	100	100	100	100	0	0
		+20	100	100	120	120	+20	+20
		+40	100	100	140	140	+40	+40
		+50	100	100	150	150	+50	+50
		+60	100	100	160	160	+60	+60
		+80	100	100	180	180	+80	+80
		+100	100	100	200	200	+100	+100
70	30	-40	120	112	72	67.2	-28	-32.8
		-20	107.5	106	86	84.8	-14	-15.2
		0	100	100	100	100	0	0
		+20	95	94	114	112.8	+14	+12.8
		+40	91.4	88	128	123.2	+28	+23.2
		+50	90	85	135	127.5	+35	+27.5
		+60	88.7	82	142	131.2	+42	+31.2
		+80	86.6	76	156	136.8	+56	+36.8
		+100	85	70	170	140	+70	+40
50	50	-40	133.3	120	80	72	-20	-28
		-20	112.5	110	90	88	-10	-12
		0	100	100	100	100	0	0
		+20	91.7	90	110	108	10	8
		+40	85.7	80	120	112	20	12
		+50	83.3	75	125	112.5	25	12.5
		+60	81.3	70	130	112	30	12
		+80	78.5	60	140	108	40	12
		+100	75	50	150	100	50	10
30	70	-40	146.6	128	88	76.8	-12	-23.2
		-20	117.5	114	94	91.2	-6	-8.8
		0	100	100	100	100	0	0
		+20	88.3	86	106	103.2	+6	+3.2
		+40	80	72	112	100.8	+12	+0.8
		+50	76.6	65	115	97.5	+15	-2.5
		+60	73.8	58	118	92.8	+18	-7.2
		+80	69	44	124	79.2	+24	-20.8
		+100	65	30	130	60	+30	-40

as the rate of fare is varied in one step in either direction from a fixed standard to which the traffic is accustomed. These curves are shown for the ratios 100:0; 70:30 and 50:50 of stable to unstable traffic. The accompanying table gives further comparisons.

In applying these curves to a specific case, consider a company which collects in round numbers 240,000 fares per day, 60,000 of which or about 25 per cent, are collected between 5 a.m. and 9 a.m. If this can be taken as an indication of the amount of stable traffic, and assuming that all of these riders will again ride on the cars later in the day, a ratio of stable to unstable traffic of 50:50 is obtained. Referring to the curves in Fig. 2 it will be seen that an increase of 40 per cent in fare would give a minimum expectation of 12 per cent increase in revenue and a maximum (probable, ultimate) of 20 per cent increase.

With operating companies which have experimented with fare increases and have actual data pertaining thereto a further check and closer results can be obtained. A certain operating company estimates its stable traffic, with a 5-cent fare, at 50 per cent. It finds that a 40 per cent increase in fare has produced a 20 per cent increase in revenue. This is the maximum of expectation for the above ratio; the minimum is 12 per cent. This company is now in possession of data with which to get a view of the problem from a different angle, i.e., of adjusting the estimate of ratio of stable to unstable traffic in accordance with results.

Consider now the extremes of traffic which would produce the above result. The 20 per cent increase in revenue may be considered as falling on the upper limit of expectancy of traffic having a ratio of stable to unstable of 50:50, or it may be considered as falling on the lower limit of some ratio A:B. Taking the two points 100:5 (i.e., 100 per cent and 5 cents) and 120:7 (i.e., 120 per cent and 7 cents) as two points on the lower-limit curve, the ratio A:B is found as 64.3:35.7. The curve extended is shown in Fig. 3 on which a fare of 8 cents shows 25.7 per cent minimum increase in revenue with 30 per cent maximum.

## White Bricks Replace Painted "Danger Lines" on Pavement

WHERE the United Railroads cars round the loops at the foot of Market Street in San Francisco, there is very heavy pedestrian traffic across the tracks, particularly during the morning and evening rush hours. As the front and rear ends of the cars swing out well beyond the rails on the sharp curves it has been the custom to keep a white stripe painted on the pavement to mark the limit of the danger zone. But these lines last only a few weeks and in fact are at their maximum efficiency as markers only for the first few days because the contrast in color quickly wears off, particularly in wet weather.

A plan of making these lines permanent by inlaying in the pavement intermittent rows of white enameled bricks has recently been carried out, and as no maintenance is anticipated, it is expected that this will be



DANGER LINES SHOWN BY WHITE BRICK

cheaper in the long run than the use of paint. Holes were cut in the asphalt a trifle larger than the bricks which were then grouted in with neat cement. The use of a dotted line was considered more striking to the eye than a continuous line would have been. About 330 bricks were used for all three loops. These bricks, which cost \$110 per thousand, would not be suitable under vehicular traffic, but are expected to give satisfactory service at this point where nothing but pedestrian traffic crosses the pavement.

The words "Danger, Keep Off" were put in two places just inside the white brick line, set flush with the pavement surface. The letters were made 12 in. square and were cast at the company's shops, the facing material being marble dust and white cement. The letters are 2 in. thick, of which only the upper half is the white composition, the remainder being common concrete reinforced with No. 12 galvanized wire. The letters were cast face down, the marble compound being put into the forms first and on this a solid concrete base 12 in. square was cast on all letters alike.

When the letters had to be put in basalt-block pavement a section of the blocks was removed and the letters were set in asphalt. Asphalt was filled in the inclosed parts of the letters before they left the casting yard. The bricks and letters were laid by the street repair crew without difficulty.

The work was done under the direction of B. P. Legare, engineer maintenance of way, United Railroads.



## British Track Laid Without Ties

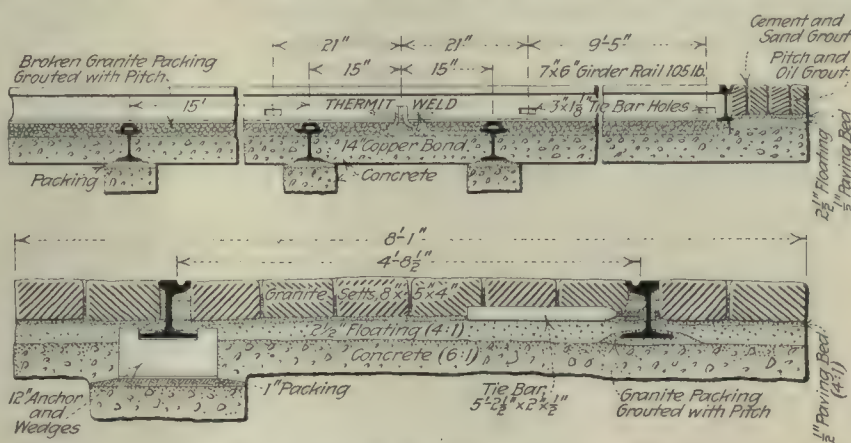
Leeds Practice Quoted as an Example—Instances of Use of Ties on High-Speed Lines or with Poor Subsoil

BOTH American way engineers and American manufacturers of way material should be interested in the following particulars of city track construction at Leeds, inasmuch as it is typical of the latest British practice which is radically different from anything done in the United States or Canada. Possibly the most fundamental difference is that cross-ties, so common with us, are the exception in the United Kingdom. Instead, the rails are laid on a concrete bed with nothing more between the base and the concrete than some pitch-grouted packing. The construction shown in an accompanying illustration was put down by R. Bickerstaffe Holt, who, until March, 1919, was highways and permanent way engineer of Leeds but is now a member of the staff of C. P. Sandberg, consulting engineer, London. Mr. Holt is the author of "Tramway Track Construction and Maintenance" (March, 1915) and a recognized authority on the subject.

The construction in question shows concrete laid all the width of the track for situations where the subsoil is clayey and hard to drain. The mix 6:1 means four parts of broken stone two parts of sand and one part of cement. The depth of this base is approximately doubled at the rail anchorages, which are spaced 15 ft. centers ordinarily and 10 ft. on the higher-speed lines. Except at these anchorages the rail bases are imbedded in a granite packing grouted with pitch or some patented compound like "Fibrastic." Between the concrete sub-base as a whole and the paving bed, there is used a 4:1 mix (four parts of sand to one part of cement) which is not actually a floating mixture but a moist

(or paving blocks) have been rammed; the bed is perfectly hard and unyielding, and in any case it is undesirable to have a resilient cushion between the setts and the foundation. If resiliency is desired it should be obtained at the surface of the paving, not beneath it." Where wood blocks are used, as in front of churches and elsewhere, they are laid exactly as granite. On suburban roadways the top covering is  $4\frac{1}{2}$  in. tar and macadam.

The 7-in. 105-lb. rail used in Leeds is a special design registered by Mr. Holt. Its web is  $\frac{1}{8}$ -in. thicker than the web of the British standard rail of equal weight and is directly beneath the center of the rail tread. The tread is convex and is inclined toward the groove, the convexity and inclination arrived at being the result of hundreds of gagings of partly-worn rail and wheel



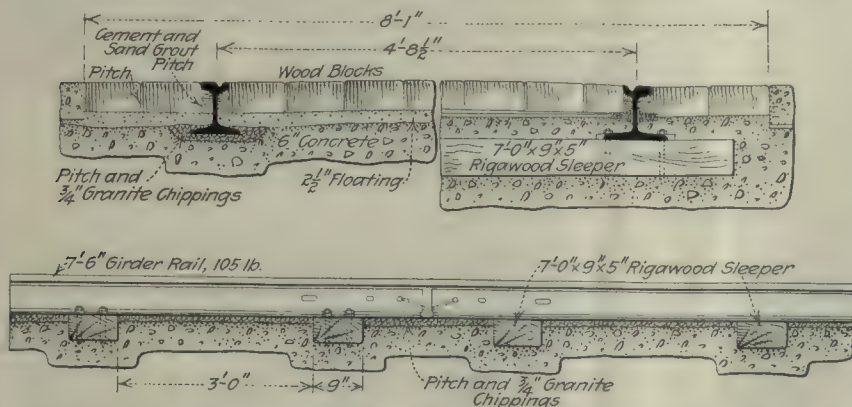
STANDARD TRACK CONSTRUCTION IN LEEDS

tire sections. In this form of the tread, Mr. Holt anticipated the design ordered by the Brooklyn Rapid Transit Company in 1915, although his reason for wanting a coned tread is not the same. It will be recalled that the Brooklyn section was changed in order to reduce such corrugation as seemed due to over-stressing the metal in the rail tread because of insufficient areas of contact between wheel and rail. In Leeds, the change was made

to insure longer life and better traction quite regardless of any one factor of destruction. It is not asserted in Leeds that the particular curvature used there should be universal, because differences in rolling stock, brake rigging and brakeshoes, characteristics of rail and wheel metal, etc., must all have some influence in the determination of the most efficient curvature or tread-to-tread contact on a given railway. More than 7000 English tons of this section have been laid since January, 1910, at Leeds. No extrusion of metal has been observed to date although as many as 2,000,000 cars averaging 11 English tons each empty and 15

loaded have passed over one route so equipped.

The rails are helped to stay to gage by means of 3-in. x  $1\frac{1}{2}$ -in. tie bars or rods spaced 3 ft. 6 in. The standard rail connection is the thermit weld, some 20,000 welds having been made in Leeds since 1902. In fact, Leeds was the first big undertaking to apply thermit for the elimination of the joint, and it has adopted every im-



SLEEPER OR CROSS-TIE CONSTRUCTION OCCASIONALLY USED FOR PAVED STREETS IN CLAYEY SOIL AND ON HIGH SPEED LINES

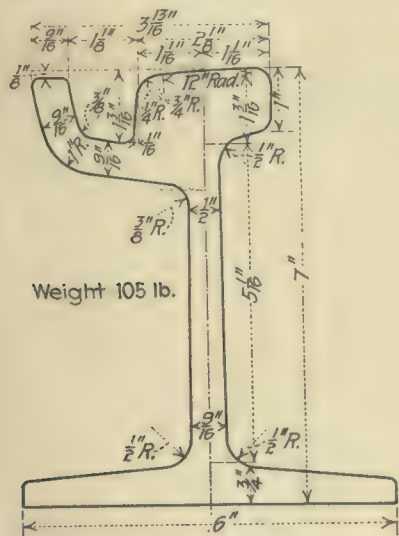
mixture pounded in. The  $\frac{1}{2}$ -in. paving bed for the granite block paving is also of this moist cement. Once this has set it will tend to prevent water from surging under loosened rails or paving. In this connection, Mr. Holt points out in his book that: "It is a mistake to suppose that a sand paving bed affords any advantage in the nature of a cushion beneath the paving, after the setts



provement which seemed desirable in the light of its own experience or the experience of others. The welds made in recent years show a great improvement in freedom from breakage over those of earlier years. In the opinion of Mr. Holt, it is time that city rails were made of compositions and to sections more suitable for welding. It is unfair to expect perfection when the profiles are designed for fish-plate joints and the web is too thin to withstand molten metal without liability of damage. Most of the breaks that have occurred in thermit welds were in rails that had previously been weakened by being bored for mechanical joints. As a matter of precaution, a 14-in. No. 0000 copper bond is used to insure an uninterrupted return in case of breakages. In recent welding of fish-plate joints and repairs of broken thermit welds, the Leeds City Tramways has used home-made electric welds. However, for all new work the thermit process remains standard.

#### CROSS TIES DESIRABLE WITH BAD SUBSOIL

While cross-tie, or transverse-sleeper, construction is comparatively scarce in Great Britain, it is accepted by many engineers as desirable where the subsoil is bad. Elsewhere the only advantage of the ties is to act as



SECTION OF LEEDS SPECIAL RAIL

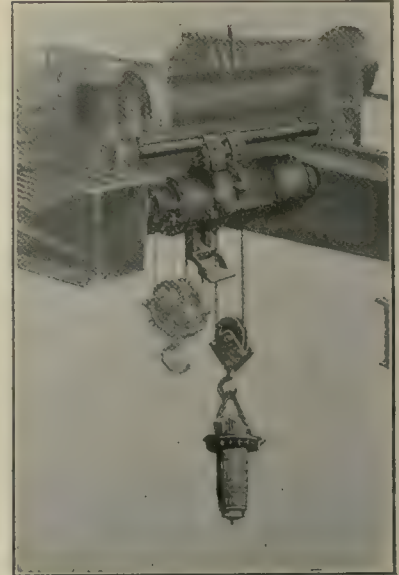
anchors when the track is floated and by their resiliency to absorb some vibration. But it is thought that all of the latter advantage is lost if rails between the ties rest on a rigid foundation. Thus, in Leeds, there is a short section of track resting on ties where the foundation between the ties consisted originally of cement and granite chippings. In the course of time this foundation required attention, and it was replaced under the rails with pitch and chippings, as indicated in one of the drawings. The standard construction is also shown.

The Leeds system is one of the first users of the Sandberg "sorbic" process of hardening the head of a rail in place. The pioneer installation amounts to about 2400 ft. on Park Row and elsewhere. On Park Row more than 250,000 cars have run over this hardened rail in two years, yet Mr. Holt has found no evidence of wear. Better still, the incipient corrugations in the rail at the time the hardening process was applied have since disappeared. The hardening need not extend to a depth greater than  $\frac{3}{16}$  in. It is not comparable exactly with case-hardening as one molecular granulation blends into the next instead of presenting a line of cleavage.

#### Auxiliary Hoist for Traveling Cranes

**A**N AUXILIARY hoist for attaching to any standard overhead electric traveling crane, as shown by the illustration, has recently been developed by N. B. Payne & Company, New York City.

The hoist does not require additional room overhead nor does it shorten the travel of the trolley on the bridge nor interfere with the accessibility of the main hoist. It is pointed out by the manufacturers that the average traveling crane in a day's work usually handles a far greater number of light loads than heavy loads. Since cranes for lifting heavy loads are slow-moving, their use results in a serious loss of time if they also handle the light loads. Thus a 20-ton crane, with a hoisting speed of 12 ft. per minute per load will handle a 3-ton load at but slightly greater speed. But with the auxiliary hoist a light load of say 3 tons may be handled at a speed of from two to ten times that of the main crane.



AUXILIARY HOIST APPLIED TO CRANE

Very often the hook and block of the main crane together weigh more than some loads frequently handled. The auxiliary hook and block being much lighter require less power. The labor saving with the auxiliary hoist is another important item, especially when a gang of men must wait for a small piece to be slowly moved by a large crane. By the application of this auxiliary attachment any standard single hoist electric traveling crane may be equipped with two lines for drop-bucket service. The control may be arranged from cage, floor or pulpit to suit the crane to which it is applied.

#### New Type of Solderless Connector

**T**HE accompanying illustrations show a new type of solderless connector for splicing small wire which has recently been placed on the market by Dossert & Company, New York. This is designated as type "D" two-way connector and consists of male and female threaded parts acting upon a slotted tapered sleeve or



TYPE D, NO. 8 CONNECTOR; TYPE D, NO. 14 CONNECTOR

bushing, making the splice by compression. This connector is supplied in two sizes—No. 8 being for use on No. 8 and No. 9 wire and No. 14 being for use to connect No. 10, No. 12 or No. 14 wire as desired.

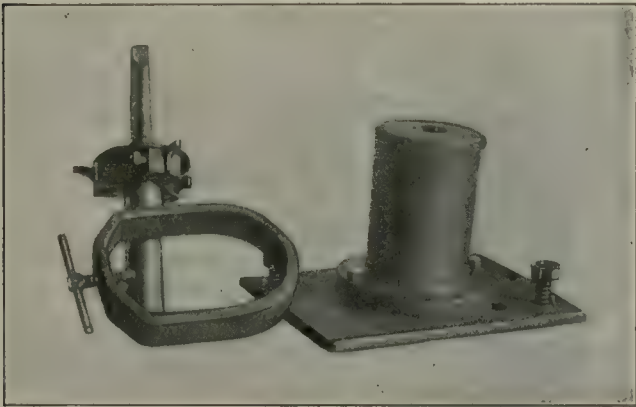
The illustrations show the actual sizes of the connectors as well as the details of their construction. Either solid or stranded wire can be connected.



## Boring Machine for Journal Brasses Made from Old Axle

Machine Used in Chicago Which Turns Out Four Brasses a Minute and Needs No Experienced Labor to Operate It

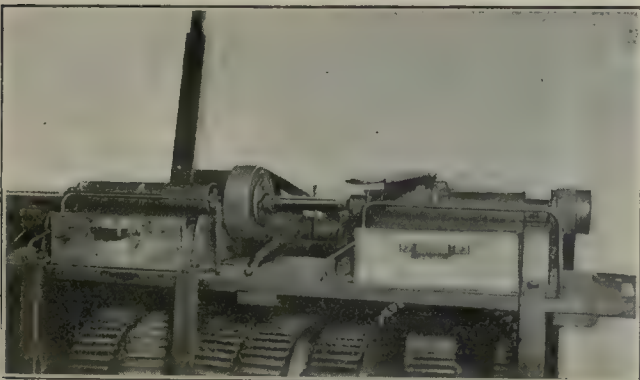
**T**HE Chicago Elevated Railways at the Wilson Avenue shops of the Northwestern Division have made from an old axle a very effective piece of equipment for boring out journal brasses. Prior to the construction of this machine several methods were tried but as none proved either satisfactory or efficient



END MILLING TOOL DISASSEMBLED SHOWING VARIOUS PARTS

boring out the brasses by machine was given up and the filing after babbiting was done by hand, a process which took a great deal of time. It was realized that if the proper machine could be developed not only could considerable time be saved on the post-babbiting operation but brasses could be bored out and placed back in service several times before rebabbiting was necessary, thus resulting in both an additional saving in time and a saving of babbit as well as doing away with the hand operation of filing just referred to.

The machine as developed is shown in the accompanying photographs and drawing. It consists first of a

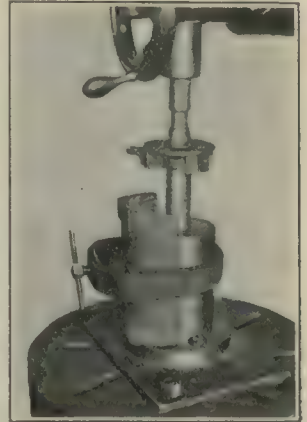


BORING MACHINE SHOWING HANDLE WHICH WORKS ON FEED SCREW AND DRIVES BRASS OVER CUTTING TOOL

piece of 4½-in. axle 37 in. long shown on page 746. For a length of 13 in. on one end this was turned down to a diameter of 1½ in. and threaded twelve threads to the inch for 11 in., the remaining 2 in. being left for a bearing surface. For 8½ in. beyond this, the axle was turned down ½ in., leaving a diameter of 4¾ in. A

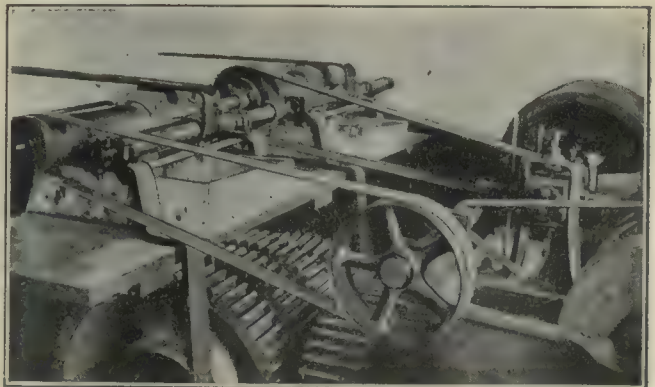
groove 1 in. wide and ½ in. deep was then made in the axle and a hole and keyway made for a cutting tool. The next 8½ in. of the axle was left at a diameter of 4½ in. and then the last 7½ in. was turned down to 1½ in. in diameter, 2 in. of this length being used for the second bearing surface and the remainder for attaching the driving pulley.

The axle in its finished form is mounted on a table built from two 11-in. x 1½-in. planks and four 2½-in. x ½-in. strips of iron. Just back of the axle and mounted on bearings is a 1½-in. bar of iron, on one end of which is fastened a 2-in. square piece of iron 15 in. long, one end of which is formed into a handle. A groove is made in this block at the proper distance from the end and with the proper diameter so that when babbit is poured into it threads may be formed to fit the threaded end or feed screw of the axle bar. At the middle of the 1½-in. bar onto which this handle is fastened is attached a 3-in. x ½-in. strip of iron bent into such shape that when lowered it will hold the journal brass in position on the axle. The machine as



MILLING DEVICE FOR END MILLING OF NEWLY BABBITED JOURNAL BRASS

built was a double one, for boring two bearings simultaneously. For this purpose a 4-in. axle was used on one side and a 4½-in. axle on the other because these two sizes chiefly are in use on the system. It will be noted in an accompanying illustration that different holding arrangements for the brasses have been necessary. The two equipments are driven from a single pulley by means of a flange collar as shown. The large wooden pulley is split and fastened by ½-in. studs while the collar is shrunk onto the end of the second machine, the thread being turned off for a short distance, and is held to the pulley by four



DOUBLE BORING MACHINE FOR JOURNAL BRASSES AS BUILT IN CHICAGO ELEVATED RAILWAYS SHOP

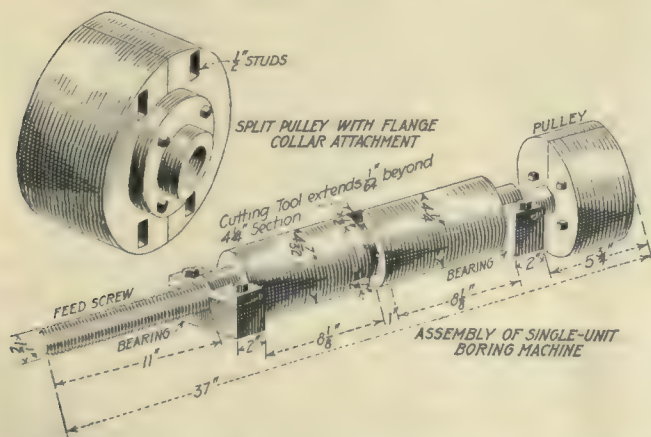
bolts. This boring machine is driven by an electric motor the control switch for which is placed on the wall beside the machine in a convenient location for the operator.

The operation of the machine is so simple that experienced labor is not necessary and the individual who



inspects the journal bearings and finds a worn brass bores one out and returns it to the same position without delay. The brass is laid on the section of axle which is  $\frac{3}{8}$  in. smaller than the standard and the iron lever is brought down to hold it fast. The machine is placed in operation by throwing the switch and the iron handle is brought up into contact with the feed screw of the shaft. This starts the  $1\frac{1}{2}$ -in. bar and iron lever, consequently the brass which it holds in position is moved horizontally and passes over the cutting tool and immediately onto the standard section of journal. Sometimes the brass needs to be run over the machine twice. The single operation takes about fifteen seconds so that ordinarily two minutes is consumed in boring or re-boring brasses for an entire truck. Pans are used under the machine to catch all babbitt and this is saved and used in rebabbiting. The brasses are bored on every general overhauling and also on inspection when found necessary.

As an auxiliary to this boring equipment an end milling device for end filliting of brasses has been developed for use on rebabbited  $4\frac{1}{2}$ -in. journal brasses. This also has been made from pieces of old axle. The bottom section is  $6\frac{1}{2}$  in. in diameter for 1 in. and  $4\frac{1}{2}$  in. in diameter for  $6\frac{1}{2}$  in. This is fastened by two bolts to a 12-in. x 8-in. plate which is held on the drill press by two additional bolts. The top section is  $1\frac{1}{2}$  in. in diameter for  $5\frac{1}{2}$  in. with the next inch 4 in. in diameter cut out and keyed as shown so as to accommodate three  $\frac{1}{4}$ -in. x 1-in. high-speed Novo steel cutting tools. A



ASSEMBLY DRAWING SHOWING DIMENSIONS OF SINGLE UNIT BORING MACHINE

$\frac{1}{8}$ -in. plate 4 in. in diameter is shrunk on at this point and the remaining 6 in. of the axle is turned to fit a No. 4 Morse taper shank.

The journal brass is held in position by the screw clamp as shown and the babbitt on both ends of the brass is milled out in about one minute. This operation was formerly done by hand and took approximately one-half hour to the brass. This double milling permits the use of either end of the brass against the fillet of the axle and prevents a mistake due to haste or ignorance which will later result in a hot journal. A sheet tin guard is placed around the drill press and the babbitt is saved by catching it in pans placed under the machine. In the finishing operation enough babbitt is obtained from the milling of twelve brasses to rebabbit two additional brasses.

## Plundering by the Germans

INTERESTING sidelights upon the experiences of Belgian tramways in war-time are given in recent articles published by *The Electric Railway and Tramway Journal*. The three cases cited, those of Antwerp, Malines and Namur, show the harmful effects of the occupation of Belgium by the Germans.

In the case of Antwerp, the bombardment of Oct. 8 and 9, 1914, and the subsequent fires destroyed or greatly damaged the track in many places, broke or destroyed the overhead lines and damaged the carhouses and rolling stock. The Germans forced the company to suppress several lines and reduce the service considerably. They also requisitioned all the copper work on the cars, the brake handles, the controller plates and handles, the door handles, the guard bars of the windows, the grab handles, the copper bearings, the copper trolley wheels; all tin, antimony, etc.; all cotton, section and other wires; the bell straps, the wires of the lines in the stations and the telephone guard wires.

All the elements necessary for the upkeep of the rolling stock were replaced by substitutes furnished by the Germans (except when they had none!). The engine cylinder oils and engine lubricating oils were only oils in name, so that during the period of the occupation the steam sets were more worn and damaged than during fifteen years of regular service. The same applies to the bearings of the cars, the axles and the fuses of the armatures.

All the anti-friction metals were replaced by "war bronze," a composition of zinc, lead and a trace of tin. The trolley wheels were of zinc. At the maximum they gave one day of service, equal to, say, 150 km. run. The company could get no wrought iron, cast iron, sheet iron, wood, colors and paints, cotton, gasoline or scarcely anything else. The situation at Antwerp is said to be still very troublesome. The company cannot yet obtain the necessary materials to put in a proper condition the track and rolling stock. What little it is able to secure is at prices which are five or seven times those of 1913.

At Malines the service was interrupted from September, 1914, to March, 1915, and in October, 1917, it was completely stopped. The Germans carried off all the overhead copper wire, all the bronze or brass fittings and all the leather work of the cars. It is said to be impossible to resume the working of the lines at Malines until the receipt of the necessary copper wire and accessories, which must come from abroad. The rolling stock still remains at Malines.

In 1914 the Germans dismantled a part of the electric equipment of one of the Namur lines in order to re-establish a line which had been destroyed by the fires lighted by their soldiers. Later came their general requisition of copper, whereby they took 24,695 meters of overhead wire and underground cable.

These measures led to a serious drop in tension which augmented the chances of accident to the motors. This was aggravated by the dismantling of one of the two trolley wires except in the center of the town. Altogether the Germans took down 24,800 meters of trolley wire, and it was necessary to replace copper wire in the stations by iron wire. The enemy also appropriated more than 25,000 meters of wire serving as protection for telephone circuits, all the copper fittings of the cars, and the straps used for working the ticket stamps.



## LETTERS TO THE EDITORS

### What the Questionnaire Taught

April 5, 1919.

To the Editors:

It occurs to me that the ELECTRIC RAILWAY JOURNAL has performed a helpful service to the industry in presenting an "analysis of public thought" on important questions affecting our business. I refer to the summary of answers to your questionnaire as published in your issues of Feb. 22, March 1 and March 29, giving the views of public service commissioners, mayors, representatives of chambers of commerce and civicists on the fare and franchise situation. This was truly a case of holding the looking glass up so that we might see ourselves as others see us, and if the men who control our utilities are so blind as to see nothing in this reflection they must indeed be beyond salvation. There are probably many such individuals—men who are still living in the past, men who believe the public does not know what it is talking about, men who will persist in the old rut of their "public be damned" policy.

Assuming, however, that the great majority of leaders in the industry are honestly trying to do the right thing, the opinions elicited from "the opposition," in your experience of feeling the public pulse, must be of great assistance. Undoubtedly there have been, and still are, mutual misunderstandings on the part of the railways and the public on many of these disputed points. Your questionnaire covered a wide field, and it has helped to reveal what a certain portion of the public thinks on the question, "What is wrong with the railways?" If the public is right in some of these opinions then the railways should be prompt to set themselves in the proper course. If the public is wrong it is a duty of our railway men to undertake a campaign of education to set it right.

Touching first on the question of increased fares, it appears that some of the leaders on "the other side" believe that the companies have profiteered or made more than a reasonable return in the past. The public would hold them accountable for the sins of the past. Undoubtedly this indictment is true in some cases, and it is a hard condition to correct because the persons who were guilty of profiteering when that practice was more common may long since have passed out of control of the properties. Again, the public raises the question of overcapitalization, which undoubtedly exists on some properties. This can be remedied by submitting to a new valuation. And so on with the other complaints which are made. Some situations can be corrected and others cannot, but the honestly organized and conservatively managed company should not be made to suffer for the errors of another.

Taking up next the matter of publicity, it seems that even in this particular there is much to learn. Perhaps this was covered just as well by Ivy Lee in a talk at the 1916 convention when he said that "a man who goes into a policy of publicity must believe absolutely that he is right and that he can justify his policy upon the theory that 'truth loves open dealing,' and that he can rely absolutely upon the refining and sterling value of the truth." First of all public distrust has to be overcome. Then if the management will show by deeds that it means well, happier results may be expected.

The committee on readjustment of our association is performing a splendid service in trying to save the industry from disaster. Is it not possible that it would find a valuable guide to public opinion in the series of discussions referred to in this letter? There is much food for thought in what "the other fellow" thinks.

MANAGER.

### Mr. Schaddelee's Commutation Plan

NEW YORK CITY, April, 9, 1919.

To the Editors:

I have just read the article on the fare plan proposed by Mr. Schaddelee, published in your last week's issue, by which the greater part of an electric railway fare increase will be placed on the casual rider rather than on the person who uses the service a large number of times a month. The idea is ingenious in its method of application, and is well worthy of discussion, especially in view of our disastrous past experience with fare increases made without consideration of their reaction upon the various classes of riders and, through these, upon net revenue.

Reduced to simplest terms, a successful fare increase must have two elemental qualifications; it must apply to a sufficient number of patrons to provide an appreciable gain in gross revenues despite the inevitable decreases in patronage, and it must conserve net earnings by affording a minimum of discouragement to the most profitable classes of patrons. In other words, the patrons who are driven away should be those who are carried at a loss anyway, like the long-haul and rush-hour riders. Devoid of these characteristics, any plan for increasing fares is likely to be as dangerous as a souvenir hand grenade.

The proposed plan has several outstanding advantages. One is that it increases the rate without requiring the conductor to make change with pennies. Another is that it places the greatest increase in the rate upon those who pay fares infrequently and who presumably would suffer the least hardship from higher fares. Hence, its introduction ought not to be difficult, comparatively speaking.

Its disadvantages are equally pronounced. One of these is that it perpetuates, without alteration, the wrong principles of the old flat fare which has let the industry into such evil days through its neglect of the vital factors of length of ride and failure to differentiate between rush-hour and non-rush-hour traffic.

Properly speaking, of course, the casual rider who makes only one trip a year, let us say, could be charged with the same annual readiness-to-serve cost as the man who rides twice daily. And if the cost of readiness to serve were 3 cents per trip for the latter, the book cost of the casual rider's single trip would be about \$18! Actually, however, the casual riders, in the aggregate, appear to approximate a normal load on the average street railway because they seem to be pretty generally spread out over the year's business. If this condition really applies, the casual rider properly should pay no more readiness-to-serve charge than the regular patron. If charged much more, his patronage will be discouraged. Such an outcome would be desirable only if he were, in the aggregate, an unprofitable patron.

But is the casual rider always an unprofitable patron? Is he not, as a matter of fact, quite frequently found during off-peak hours and among the short-haul traffic? If so, he would be a profitable rather than an unprofit-



able patron, and it is a question whether he should not be encouraged by a lower fare rather than discouraged by a higher one. It is an open question, also, whether the casual riders exist in sufficient numbers to make the proposed plan conform to the first elementary requisite of a successful fare increase and really make a difference in gross revenue. Consequently, until the status of the casual rider (of whom no statistics appear, at present, to be available) has been determined, a fare increase based merely upon his ability to pay more and upon the simplicity of the plan for charging him more would be a repetition of the industry's leap in the dark when it tried out the flat-fare increase with such unsatisfactory results. **TRAFFIC ENGINEER.**

[EDITOR'S NOTE. Is not every fare increase largely a leap in the dark? Each change to a higher fare will undoubtedly turn away some passengers, but how many depends on the psychology of the patron affected and the state of his pocketbook. The more systems which promise a reasonable chance for success that are tried, the better. We hope that somebody will give Mr. Schaddelee's plan a fair trial.]

## AMERICAN ASSOCIATION NEWS

### Attendance of 1500 at Toledo Section Entertainment

ON MARCH 28 in the Coliseum Theater, the Toledo joint company section held an "open" meeting of an entertainment character, attended by 1500 members and guests. Entertainers from the local Keith Theater, from the company's ranks and elsewhere gave a vaudeville performance. One feature was music by the Rail-light Orchestra, made up of employees of the Toledo Railways & Light company.

### Committee on Compensation for Use of Terminals

A MEETING of the Committee of the Transportation & Traffic Association on "Proper Basis of Compensation to City Companies by Interurban Companies for Use of Terminals," which was held in Cleveland on Wednesday, April 9, at the Hotel Cleveland.

The meeting was attended by G. T. Seely, assistant general manager Metropolitan West Side Elevated Railway Company, Chicago, sponsor for the committee's activity; R. T. Sullivan, general manager Mahoning & Shenango Railway & Light Company, chairman; J. F. Collins, general manager Michigan Railway, and James W. Welsh, special engineer American Electric Railway Association.

The association had prepared a compilation of existing contracts between city and interurban companies as well as other data on this subject, including clippings from the technical press. In view of the fact that there had been no previous committee report on this subject, the committee decided to present abstracts of a number of typical existing contracts, showing the principal elements heretofore considered essential in such agreements. It is recognized, of course, that in most cases such agreements are the result of negotiations between the interested parties.

The committee spent considerable time in discussing

the fundamental principles which should form the basis of such contracts. In view, however, of the general adoption of service-at-cost principles, the committee expects to work out a proposed standard form of contract embodying these elements with the view of securing equitable conditions from both the city and interurban points of view.

### The Struggle Against Increasing Costs

AT A MEETING of the Windsor, Conn., Business Men's Association on Feb. 4, J. K. Punderford, explained very frankly the situation in which the Connecticut Company, of which he is general manager, finds itself at present. Among many other interesting things he showed what the company is doing to keep down maintenance costs, for example, he said: "We have established at New Haven what we call a reclamation shop for the entire property where modern devices for welding, etc., have been installed". By the use of these facilities we have saved large sums of money in rendering defective equipment usable. During December, 1918, this shop rewound motor and air-compressor armatures and field coils, welded gear cases, motor shells, etc., and did work at an estimated saving of nearly \$6000 over what it would otherwise have cost. In the track department<sup>1</sup> we have purchased electric and steam shovels by which we have excavated material at 7 cents per cubic yard instead of paying 60 cents for hand work. By the use of these shovels the time which would have been lost by teams waiting for loads was largely decreased. We have purchased various forms of rotary and reciprocating grinders by which we have saved corrugated rails. Large savings have been made by the use of welding machines. In five years we have reclaimed rail which would have cost more than \$200,000 to renew and at the same time we have saved the additional cost of new ties and pavement. Broken rails have been repaired at about one-tenth the cost of replacing. Much special work also has been repaired. For example, in one case the repair cost \$90 whereas under former methods the expense would have been more than \$3,600. We have also purchased pneumatic tie-tamping machines by the use of which one man can do the work of six as compared with the old method of hand tamping. These machines are also available for breaking up old concrete pavement economically. Through the use of power-saving recorders and awards made to motormen large economies have been obtained in the line of power consumption. We are now putting into service a few safety cars<sup>2</sup> in an endeavor to lessen power and maintenance costs."

Hakone, Japan, the site of the famous hot springs of the same name, is to be connected with the capital, Tokyo, by electric line in the near future. The springs are located in the mountains, accessible only with great difficulty. The electric railway extension, although but 5½ miles long, presents great construction difficulties on account of the steep grades necessary and the twelve tunnels which must be bored through the mountains. When the extension is completed it is expected that Hakone will become Japan's greatest summer resort.

<sup>1</sup>See ELECTRIC RAILWAY JOURNAL, Aug. 31, 1918, page 365.

<sup>2</sup>See ELECTRIC RAILWAY JOURNAL, Dec. 14, 1918, page 1053.

<sup>3</sup>See ELECTRIC RAILWAY JOURNAL, Feb. 15, 1919, page 316.



# News of the Electric Railways

FINANCIAL AND CORPORATE • TRAFFIC AND TRANSPORTATION

PERSONAL MENTION

## Strike Threat in Brooklyn

**Receiver of Brooklyn Rapid Transit Refuses to Deal Outside of His Own Organization**

Organized labor is marking time with respect to the demands made recently on the management of the Brooklyn (N. Y.) Rapid Transit Company. Meanwhile the Mayor has been asked to use his good offices with Receiver Garrison. This the Mayor has promised to do, but he has warned the men that the railway is subject to federal authority through the courts and that he does not want to seem to be interfering with such authority.

### WANT SIXTY CENTS AN HOUR

The proposed agreement submitted to Mr. Garrison was adopted on March 28 by the unionized employees. The demands include, besides recognition of the union, 60 cents an hour for platform men during a nine-hour day, 60 cents for a nine-hour swing during rush hours, 53 cents for blacksmiths and structural workers, 45 cents for shopmen for an eight-hour day, and time and a half for overtime.

In his reply to the unionized employees Mr. Garrison directed attention to the notice of the company to all employees dated March 11 in which reference was made to the two recommendations of the War Labor Board of March 6, 1919, and Oct. 24, 1918. While the board in these recommendations said that as a matter of plain right and justice the company should give full and free permission to all its employees to organize, it held that under the principles of the board "the company, not being bound otherwise by any contract or agreement with the union, may refuse to see and deal with any committee but one of its own employees."

### WILL TREAT WITH EMPLOYEES ONLY

After directing attention to these facts Mr. Garrison in his reply to the recently-organized union accordingly expressed his willingness to meet a committee of the employees, but said that "it would not be consistent with the policy above mentioned, or with the best interests of the employees or the management to take up for consideration the agreement you have submitted, which in form is between the company and its subsidiaries and only members of a particular labor union, and does not include all the employees."

Mr. Garrison concluded his communication to the union as follows:

The management will not deal with any outside organization, whether the same be, as mentioned in its notice of March 11,

1919, religious, patriotic, benevolent, political or labor. It will always be ready to deal with its employees directly through committees selected by the employees in respect of any matters of mutual concern to the employees and the management.

The Mayor's promise to the men was made as a result of a call upon him by a committee which urged him to intercede with Mr. Garrison in an effort to persuade the receiver to meet a delegation of union men. The committee warned the Mayor that unless the receiver greeted their demands in a more conciliatory fashion there would be a strike.

At Mr. Garrison's office on April 9 it was stated there that the receiver had made his position in the case clear in a letter to James Sheridan, chairman of the committee selected by the men, and that he would not recede from his position. In this letter Mr. Garrison declared that the Amalgamated Association was an "outside organization" when it came to situations arising between the company and its men and that he would not deal with the association of its representatives, as such.

## Self-Determination for Kansas City Men

In accordance with the new policy of the Kansas City (Mo.) Railways of dealing direct with its men in the future, the employees held a meeting on April 7 and elected their committees. The representation which went into effect on April 1 provides for committees from each division of the transportation department, shops, substations and power plants. Philip J. Kealy, president of the company, will name one day in each month on which he will meet these committees and receive reports and hear complaints from them. The general manager, superintendent of transportation and the head of every other department will also appoint a day on which to meet the committee.

In any case in which a matter does not appear to have been settled in a manner satisfactory to the men they are empowered to reopen the matter direct with the president. The company promises not to open any welfare or benefit features on a compulsory basis. No employee is to hold seniority rights in more than one department. Such rights are to be based on continuous service. Employees of long standing who find that they are unable to do heavy work may be transferred to other and lighter work in a different department from the one in which they have been serving and still hold their seniority standing. The minimum wage for extra motormen and conductors is fixed at \$75 a month.

## Stands Its Ground on Women

**Cleveland Railway to Abide by Its Agreement with Union—Incident Now Closed**

The Cleveland (Ohio) Railway recently decided to abide by its agreement with the union not to employ women conductors, notwithstanding the order of the National War Labor Board of March 18 directing the company to reinstate sixty-four conductorettes. Former President William Howard Taft and Basil M. Manly, joint chairmen of the War Labor Board, signed the order for the reinstatement of the women. They concluded their decision as follows:

The evidence discloses that the company is still short of employees and that there are places vacant to which these sixty-four women can be restored. Indeed, it was made clearly to appear, by the only evidence submitted at the hearing where all the parties were notified to appear, that the company may restore to their places in the service all men who have been absent in military service during the war and still have vacancies sufficient to give employment to these women applicants.

The board feels an injustice was done to the women applicants in making the order of Dec. 3, 1918; that it was made upon the application of the Mayor of Cleveland and in the absence of the women who were affected and who had not understood the issue was before the board and on its merits. In other words, the women did not have their day in court. That requires that this board should re-establish the status which existed before the order was made.

A ruling was made by the joint chairmen in Detroit that under the contract which bound the company and the men in that case, the time had arrived when the company was not justified in continuing the employment of women, because such employment was limited by the contract to the existence of the necessity for their employment, but that the women already employed and in the service should continue there until, in the ordinary course, their employment should cease either by voluntary withdrawal or by discharge for cause or other sufficient reason. We feel the principle which obtained in the Detroit street railway case should apply here.

The only question before us is whether these women who were discharged on March 1, should have been discharged by reason of any contract between the company and the men. We think the terms of their employment justified them in believing that their employment would continue until normally ended by their voluntary withdrawal or the failure on their part to render proper service, or other sufficient reason. We have drafted this opinion in accordance with the resolution of the board, as follows:

That the matter be referred to the joint chairmen with direction to frame an order declaring the similarity between this and the Detroit case, approving the principles held in the Detroit case, and on the basis of that case, directing that the sixty-four women heretofore discharged by the company be reinstated to their employment.

For these reasons, the present order will be that the order or recommendation of Dec. 3, last, be set aside, and that the company be directed to restore these women, discharged March 1, last, to the position they had in seniority and other privileges.

The various steps in connection with the Cleveland case affecting women employees have been reviewed from time to time in the ELECTRIC RAILWAY JOURNAL and there was a summation of the matter some time ago in these pages.



## Why Company Claims Damages

### United Railroads of San Francisco and City File Briefs on Encroachment Case Before Supreme Court

Briefs have been filed by the United Railroads of San Francisco and the city in the damage case which was argued in the United States Supreme Court on March 25. This case, as stated in the *ELECTRIC RAILWAY JOURNAL* of Dec. 21, 1918, is the result of the claim of the company for \$6,870,130 of damages because of the construction of parallel outside tracks on Market Street and on Church Street.

The case arose through an appeal from a district-court decision in effect dismissing the company's bill for want of equity. The Constitution of California requires payment in advance for the "taking" or "damaging" of private property for public use, and the company asked for relief by injunction from the operation of municipal railway cars until compensation for damages to the privately-owned property was paid.

#### THE COMPANY'S PLEA

In reiterating its assertions in the present appeal, the company in its brief adopts the following general line of argument:

1. The railway franchise is exclusive for all exceeding five blocks on any street, and it constitutes an irrevocable contract, the obligation of which is impaired by the parallel operation of the municipal cars.
2. Municipal competition deprives the United Railroads of its property without due process of law and takes it without just compensation.
3. Municipal competition damages the company's property, through loss of patronage from difficulty and danger of access to the company's cars.
4. The city has no reserved right to operate its cars so as to impair access to the company's cars and cannot under the police power justify destructive competition.
5. The civil code of California does not permit one railway to cross another's tracks without compensation.

#### WHAT THE CITY HOLDS

The brief of the city maintains that no explicit authority was given to the city to grant an exclusive franchise to the company, and that grants of special privileges are to be construed strictly in favor of the public. The issue may be narrowed to the question whether the operation of the city cars causes such physical interference with the company's rights as legally to entitle it to relief. The only damage the company necessarily suffers, the city brief says, will result solely from the occupation at times, by passing city cars, of a space in the public highway needed at the same time by the company for its passing cars. This damage, it is asserted, is not private but common to all the public using Market Street.

Furthermore, it is alleged that the operation of both roads is demonstrated

to be not impracticable under reasonable rules. It is true that the franchises of the United Railroads would depreciate to the extent of the inconvenience and the delay occasioned, but the company cannot complain of such depreciation because its own grant was dependent upon the conditions that its tracks should be constructed and operated so as not to interfere with the public use of the street, and the city purposes by its additional tracks to

subject the streets to this character of use and this alone.

It is stated that the rule governing one road occupying the same space as another road seems to rest upon clear legal foundation, but the principle cannot be extended to embrace the interference which normally and unavoidably occurs from competing operation upon outer tracks. It is a far cry, the city contends, to claim that the private railway "may assert, as against the general or the traveling public or as against those legally using the remaining portions of the street, an absolute ownership which would enable it to dictate the specific uses of the highway."

## One-Man Control for Britain's Utilities

### Revolutionary Changes in Britain's Transport and Power Through Proposed Ministry of Ways and Communications

(From Our Regular Correspondent)

At the end of February the British Government's radical proposals for dealing with all public means of transport were revealed to Parliament and the public. The Home Secretary, Mr. Shortt, introduced "a Bill to establish a Ministry of Ways and Communications and for purposes connected therewith," to bring under one national control and co-ordination all methods of transport in the country. At the same time no hard-and-fast scheme is put forward. The keynote is to give the new minister (who is to be Sir Eric Geddes, formerly of the North Eastern Railway) great and far-reaching powers to do whatever is necessary to bring the desired end about. The bill opens up possibilities of nationalization; on the other hand the minister will have discretion as to best course to take.

The minister is to take steps to improve the means and facilities of locomotion and transport. To him are to be transferred all powers and duties of any government department in relation to railways, light railways, tramways, canals, roads, bridges, and ferries and vehicles and traffic thereon, harbors, docks, and piers, and to supply of electricity. This does not increase present government powers of control but simply transfers them to one minister and his department, which is a valuable unification. To afford time for consideration and formulation of the policy to be pursued as to the future position of undertakings, it is provided that for two years after the passing of Bill, all railways which during the war have been in possession and under control of government may remain in and under that of the new minister. The latter is also enabled (word is "may," not "shall") to take possession of any other railway, or of any light railway, tramway, canal or harbor.

That is a transitory arrangement. The permanent one is that the King may by Order in Council authorize the minister to purchase by agreement or compulsion and work any railway, light railway, tramway, canal, harbor and dock; to authorize the Minister to estab-

lish and work any such undertakings, and to lease any such undertaking. The Order however is not to authorize purchase otherwise than by the agreement of any tramway belonging to a local authority, or purchase without consent of the local authority any tramway which a local authority is entitled to purchase under section 43 of the tramways act of 1870.

The bill also allows of other procedure, because it allows the Minister to make advances to local authorities or companies for construction, improvement or maintenance of various means of communication already mentioned. In regard to electricity supply, it is noteworthy that the only substantial provision in the first draft of the bill is that control of such supply is one of the powers that the new government departments may take. These powers are limited, and certainly some further proposals in this direction may be expected. If the bill passes a revolution in transport affairs in Britain seems likely.

In the meantime a most useful scheme promises to come to fruition for settlement of labor disputes in the British tramway field. The system of Joint Industrial Councils for each industry, recommended a year or so ago by the so-called Whitley committee, has already been referred to in these pages, and it has been adopted in a number of industries. An attempt to bring it into operation in the tramway business was for a time not successful, because London tramway employees did not agree to it. That opposition has been overcome, and it was announced in the beginning of March that a National Joint Industrial Council for the industry has been approved by the constituent associations—namely, the Tramways & Light Railways Association, Municipal Tramways Association and the National Transport Workers' Federation. The Council will consist of forty-four members, twenty-two for the employers, and twenty-two for the employees. On the former, fourteen will represent municipal undertakings and eight company undertakings.



## Few New Laws in Indiana

Authority of State Commission Regarded as Check to Need for New Legislation

Very few laws of particular interest to the public utilities were enacted during the recent session of the Legislature of Indiana. The new State tax law which was enacted provides, among other features, that all public utilities shall be assessed originally by the State board of tax commissioners. An amendment in Senate enrolled act No. 316, provides that a utility that contracted to furnish "free service, or service at special rates" shall do so even though it has surrendered its franchise and has received in lieu thereof an indeterminate permit. Such service is to run until "such time as the franchise would have expired had it not been surrendered."

### CHANGE IN LEASING LAW

House enrolled act No. 470 amends the law of 1913 which authorizes railroad companies to lease, sell or purchase non-competing lines of railroads subject to the approval of the Public Service Commission. Under the old law a railroad could lease or be leased by a non-competing line if both parties were organized under the laws of Indiana. And where one company held a lease of another forming a through railroad line, then either of the companies could sell or convey its railroad to the other with the approval of the stockholders owning not less than two-thirds in amount of the capital stock of the respective companies becoming parties to such purchase and sale. The old law also provided that no railroad company not organized under the laws of Indiana could purchase any line in Indiana.

The 1919 amendments to the 1913 laws provide that a railroad organized under the laws of this State "may lease its railroad in Indiana to a railroad organized under the laws of another state or states, whose railroad forms a through line, or which is connected with the railroads of the company organized as aforesaid under the laws of this State." The same consent of stockholders is required as under the old law. The leased road must be operated in this State and "shall remain liable as if it operated the road itself, and both the lessor and lessee shall be jointly liable upon all rights of action," and may be jointly or severally sued in the courts of this State.

### LAW FIXING FARE LIMITS REPEALED

House enrolled act No. 238 repeals the law which limits passenger fare on steam railroads to 2 cents a mile.

Senate enrolled act No. 287 authorizes any street railway company to "increase or reduce or modify the terms and conditions of its capital stock, or any class thereof, to create, authorize and issue one or more new classes of stock and to specify the amounts thereof and the preferences and other rights

granted to them, or otherwise amend its articles of association, by the amount of the holders of two-thirds of the class or classes of its outstanding capital stock affected thereby, declared at any regular or called meeting thereof held pursuant to the by-laws of the corporation." It is provided that the Public Service Commission must approve before such changes in stock may become effective.

## Cleveland Franchise Renewed

The City Council of Cleveland, Ohio, with but one dissenting vote, has passed the franchise extending the Tayler grant of the Cleveland Railway for a period of ten years and causing it to expire twenty-five years from May 1.

The Council, in making the extension, passed the McGinty ordinance as a substitute for the ordinance of Mayor Davis, which provided for an extension of one year only. The McGinty ordinance was introduced a week ago.

The legislation just passed contains few changes from the original Tayler grant enacted ten years ago. The changes include the elimination of repetitions.

The new ordinance also provides for a 7-cent fare for that section of Cleveland east of Ivanhoe road. The fare now is 15 cents.

The new ordinance will not go into effect until about May 10.

Council took no action on Mayor Davis' ordinance for municipal ownership of the lines of the Cleveland Railway. Councilman John Reynolds made an effort to amend the Mayor's legislation, by calling for an election on May 28. A motion to adjourn prevented consideration of the Reynolds motion.

## Ohio Association Organized

A group of electric railway executives in Ohio have organized the Electric Railways Association of Ohio whose object will be the mutual benefit and advantage of the electric railway industry of the State of Ohio, the study of transportation conditions and the devising of methods for their betterment and development and the improvement of service and enlistment of the aid and co-operation of the public in effecting such improvements. Any individual, co-partnership, association or corporation which may now or hereafter own, operate or manage within the State of Ohio, for public use, a street or interurban railway is eligible for membership.

Representatives from about thirty companies attended the organization meeting at which the following officers were elected: President, F. W. Coen, Sandusky; vice-presidents, Dana Stevens, Cincinnati, and F. R. Coates, Toledo. The secretary and treasurer have not yet been elected. The executive committee consists of fifteen members, including the president and two vice-presidents, the others being selected so that all parts of the State will be adequately represented.

## As a Commissioner Sees It

Mr. Whitney Finds Need for Changes in New York's Dual Contracts in Interest of City and Railways

In reply to the request from "Passenger" in the New York *Evening Sun*, Travis H. Whitney, acting chairman of the Public Service Commission for the First District of New York prepared a statement discussing the local transit situation with respect to higher fares. In this statement the commissioner said in introducing the matter:

Any business, to continue, must be either self-sustaining or rely on contributions. If the business be transportation, the revenue must be, likewise, sufficient to pay operating and maintenance expenses sufficient to give adequate service with safe and proper equipment, to extend the service as necessities require, and to give a proper return on the investment. This revenue must come either from the fare payers or the taxpayers. At the present time and for some time past the revenue from the fare payers has not been sufficient to pay the proper expenses and to give a return upon the investment.

Declaring that all transit lines should have the same fare or so balanced as to get the maximum efficiency from each, Commissioner Whitney said that while the companies are not getting sufficient revenue to care for the proper items of expense and fixed charges on investment, thus necessitating consideration by fair-minded men of an increase in fare, yet, on the other hand, there are concessions that should be made by the companies as a part of any agreement by the city that fares may be increased. On this point the commission said:

For example, experience has shown that there are provisions in the dual contracts that can well be modified. As it is now, the companies are entitled to their entire preferentials ahead of any return to the city. If an increase in fare were to be granted sufficient to make the dual system self-sustaining and thus without recourse to taxation, it would be fair to the city that all, or at least a part, of the preferential should be postponed until after the city has received its fixed charges. Otherwise there would be no incentive for the companies, with increased fares, to so manage their business that, after they receive their expenses and fixed charges, the city should surely secure its fixed charges. Giving the city's fixed charges priority, however, over all or a part of the companies' preferentials, would insure such management by the companies that the increased fare would make the enterprise self-sustaining both to them and to the city.

Likewise, in relation to the surface companies, there should be a consolidation of the various subsidiary companies in each system so that there should be one company in the case of each system and with provisions that, after the company has obtained from the increased fare its proper expenses and return on its investment, the city should be entitled to all or a considerable percentage of the remaining revenue, to go into a rapid transit fund, usable for either rapid transit extensions or acquisitions of additional transportation lines.

In order that the city may be in a proper position to enter into negotiations and agreements with the companies, I have felt that the city should be clothed with additional rights in respect to municipal ownership. Not that the city should, necessarily, enter into an extensive program of municipal ownership of all utilities, but because in negotiations involving large matters it is important that the two sides should be on an equal basis in respect to powers; because of this, I can see no serious objection to a municipal corporation having the same rights that a private corporation has in respect to activities that are clothed with a public interest to the extent that, for example, transportation is in the city of New York.



## Municipal Line's Plans

### Seattle Road Lays Down Preliminary Rules to Govern Service and Employees

General Order No. 1 of the Seattle Municipal Railway as enlarged by the purchase on April 1 of the railway lines of the Puget Sound Traction, Light & Power Company notified the trainmen that, with the exception of the heads of departments, all employees of the Traction Company would continue to perform the same duties for the city until notified otherwise. Superintendent of Public Utilities Murphine states that no change in the schedules or routing of cars would be made for about ten days, but some improvements in service are expected.

In closing the railway deal, the Puget Sound Traction, Light & Power Company was represented by A. W. Leonard, president, and J. B. Howe, attorney. The city was represented by Thomas F. Murphine, superintendent of public utilities, and Harry W. Carroll, city comptroller. Title to the property is guaranteed the city by a title insurance policy of \$1,000,000, said to be the largest policy of the kind written on the coast.

By taking over the property before April 1, the city hoped to be relieved of the payment of the 1919 general taxes. The valuation of this class of property is not fixed in the ordinary course of procedure until May 31, and although State Tax Commissioner Jackson has announced that the property has been placed on the assessment rolls at a valuation of \$12,000,000 the city holds that it should not be taxed, as the property had passed to city ownership at that time. It is expected the question will have to be settled by a court order.

Express service for the outside districts night and morning is one of the improvements contemplated a little later. This service will apply to the West Side, Ballard, Fremont and Woodland Park districts. Plans have also been worked out to connect every line in the city with the elevated, enabling the operation of the express cars from every part of the city to the Harbor Island West Side industrial districts.

The question of a possible increase in fares has become a live one. Superintendent Murphine is of the opinion that the city can operate on a 5-cent fare and meet every obligation. He will make a strong effort to continue the 5-cent fare.

## Buffalo Problems Acute

Negotiations are under way between E. G. Connette, president of the International Railway, Buffalo, N. Y., and representatives of the union platform employees regarding the back pay question. The employees had \$300,000 in back pay due them on April 1 under a decision rendered six months ago by the War Labor Board. The company has not the funds with which to make

payment. There is talk of a strike, but officials of the company hope that payment can be delayed until after the city's traction problems are settled.

The company has defaulted in the payment of city taxes amounting to almost \$100,000 and is now paying interest on the taxes. The property can be advertised for sale to cover the taxes at any time.

No agreement has yet been reached as to who will be the third member of the board of arbitration to solve the differences between the city of Buffalo and the International Railway. Albert S. Richey, the city's member of the board, conferred in New York during the week ended April 5 with James E. Allison, Jr., St. Louis, the company's representative.

## Sees City Ownership Ahead

### United Railways Has Settled Many Problems, but City Ownership Seems Likely

In an editorial in the March number of *The Bulletin*, official publication of the United Railways, St. Louis, Mo., Richard McCulloch, president, writes that he believes that when the valuation of the company's properties has been completed, the acquisition of the company by the city will "be merely a matter of arrangement of payments." Mr. McCulloch reviews the affairs of the company in part as follows:

The two controversies which have long existed between the city and the United Railways have been settled by agreement. The company is to pay the current mill tax quarterly, and is to pay the accrued mill tax in ten annual installments. The first of these annual installments has already been paid.

The controversy as to the validity of the Jefferson Avenue franchise has also been settled, and there is now no question as to the company's rights on the streets. The former controversies have been settled and are out of the way, and the highest court in the State has sustained the authority of the Public Service Commission to determine all other matters which might, at some future time, possibly lead to controversy.

A valuation of the company's property is now being made by the State Public Service Commission, and will probably be completed within a short time. The Public Service Commission is authorized by law to make such a valuation, and is the only regulating body that is so authorized. It is anticipated that this valuation, when completed, will form the basis of a reorganization of the company's finances, and will also be the determining factor in the rate of fare which will be authorized by the commission.

The Public Service Commission, in its order of May 15, 1918, laid down the principle that the rate of fare should be such as will enable the company to pay operating expenses, taxes, replacements and a reasonable return on the investment. Having once determined the investment and the rate which the company should be permitted to earn on this investment, it will be a simple matter of calculation for the commission to determine, from time to time, the proper rate of fare, taking into account wages, and all other operating expenses, taxes, replacements and other variable charges.

The valuation of the company's property will also simplify the purchase of the property by the city. The advantages of public ownership and operation have been pointed out frequently in these columns, and when the valuation of the property is finally established, the acquisition of the property by the city will be merely a matter of arrangement of payments.

Engineers of the Public Service Commission are now making a survey of United Railways property on which the valuation will be determined.

## New Franchise Wanted

### President Lowry of St. Paul Company Suggests Service-at-Cost Grant as Only Way Out

The St. Paul (Minn.) City Railway, included in the system of the Twin City Rapid Transit Company, has asked for a new franchise. The request is in a letter from President Horace Lowry. Further information will be asked from Mr. Lowry and when he is ready to confer with the City Council a full meeting will be called, including the Corporation Counsel. The petition was filed with the Council on April 2. Mr. Lowry's letter reads:

Under date of May 31, 1918, we addressed a communication to your honorable body requesting an increase in the rate of railway fare, and again on Aug. 15, 1918, we addressed you on the same subject.

Your commissioner of public utilities has asked the representatives of this company in public meetings if the company would be willing to surrender its present franchise if a new franchise based on the cost of service were duly granted to us by the city, and we have replied to such question by stating that we would do so. No steps, however, have been taken to draft such a franchise and we now take this means of making formal application for a new franchise in lieu of the franchises under which we are now operating in St. Paul.

Your honorable body is fully advised as to the financial condition in which this company finds itself, the same being fully revealed in the recent report of audit made by Bishop, Brissman & Company. You are also fully informed of the demands of the city of St. Paul for extensions of lines and for new paving.

Unless something is done to restore this company's financial condition it will be impossible to finance any of the expenditures which we will be called upon to make for paving and extensions, or to render to the people of the city the high standard of service which the company desires to give.

We believe the only way the situation can be remedied is for the city of St. Paul to accept from the company a surrender of its present franchises and grant in lieu thereof a new contract based on the cost-of-service plan, under which fares will increase when costs are high and decrease when costs are low.

If your honorable body is willing to approve this plan, and will pass the necessary resolution, requesting us to do so, we will be pleased to submit at an early date tentative draft of a cost-of-service franchise, which can serve as the basis for conducting negotiations.

## M. O. Bill Passed

Acting Governor Louis F. Hart at Olympia, Wash., recently signed the bill amending the municipal ownership statute to empower cities to acquire, as well as extend, own and operate railway lines 8 miles beyond city limits instead of three as heretofore. The city of Seattle thus secures permission to acquire the Seattle, Renton & Southern Railway, which will be made a part of the municipal railway system. The extension limit was placed to 8 miles to permit Tacoma to extend its city line to American Lake.

The purchase of the Seattle-Renton System was under consideration following the closing of the deal to purchase the railway lines of the Puget Sound Traction, Light & Power Company. Although a tentative understanding between the city and owners of the Rainier Valley lines was reached, there was doubt of the city being legally able to operate the southern end of the lines which extend about 4 miles from Seattle.



## News Notes

**Service Resumed After Strike.**—The Wichita Falls (Tex.) Traction Company resumed operation on March 26 after having been tied up for three weeks on account of a strike of motormen and conductors. The men received a part of their demands and yielded others. All the old men were taken back.

**Transit Bills Reported.**—Bills providing for a single commissioner of rapid transit and for a single commissioner for the regulation of public utilities were reported on April 9 by the Senate committee on public service. The separated commissions are to be substituted for the board of five Public Service Commissioners in New York city if the bills become law.

**Men in Winnipeg Want More.**—The employees of the Winnipeg (Man.) Street Railway demand that a new agreement shall go into effect on May 1 and ask 55 cents an hour, compared with the present wage of 47 cents an hour. In addition men ask for a minimum wage of \$25 a week while learning, for the closed shop and a week's holiday at the company's expense.

**Would Force Report on Municipal Ownership Measure.**—Assemblyman J. E. Gill has filed a petition signed by fifteen members of the House of Assembly to force the municipal corporations committee to report House Bill 38, which would enable the city of Trenton to acquire and operate its railway system and the lines running into surrounding communities.

**Melting-Pot Classes Among Railway Men.**—The St. Paul (Minn.) City Railway is conducting "melting-pot" classes at employees' headquarters. Each class lasts forty-five minutes and is chiefly a lecture by a public school principal on some phase of the government. Informal discussion is a feature. A similar system is followed in Minneapolis. The members of the classes are foreign born.

**Hudson Vehicular Tunnel Bill.**—The Senate of New York on March 27 passed the Adler bill, providing for the construction of the vehicular tunnel from New York to Jersey City. The measure appropriates \$1,000,000 for starting the work. New York State's share will be \$6,000,000 and the State of New Jersey will expend the same amount. The bill goes to Governor Smith now.

**Wage Readjustment Up at Springfield.**—It is stated unofficially that the men in the employ of the Springfield (Mass.) Street Railway are seeking a flat rate of \$5 for an eight-hour day. The company, on the other hand, proposes a reduction of the present wage schedules, which it contends are too

high. The present agreement expires on June 1. Discussion is expected soon between the representatives of the men and the officers of the company.

**Atlanta Company Wins Power Suit.**—A verdict has been returned for the Georgia Railway & Power Company, Atlanta, Ga., in the Cobb County Superior Court, in the suit brought in behalf of the Laurel Woolen Mills Company against the power company for \$152,000 damages. The plaintiff claimed damages on the ground that the building of the Bull Sluice dam at Morgan Falls, several years ago, reduced its own power supply. This contention was not sustained.

**Men in St. Louis Want More.**—Formal demand for 55 cents to 65 cents an hour and the basic eight-hour day has been made by members of the union, in a petition presented to the United Railways, St. Louis, Mo. The petition is to open the contract made with the men at the conclusion of the strike in February, 1918. The men ask for the opening of the contract for discussion of wages and hours only. The present wage scale is 35 cents to 42 cents an hour, on the basis of a nine-hour day.

**Wage Increase in Spokane.**—The employees of the Spokane & Inland Empire Railroad on the city lines in Spokane, Wash., have been awarded increases in pay of 6 cents an hour, or 60 cents a day, by the War Labor Board. The increase is retroactive to Aug. 8, 1918. The receiver for the company has until Nov. 1 to meet the back pay. The War Labor Board has also recommended that the company be allowed to charge higher fares. The present maximum wage of trainmen is 39 cents an hour.

**Duluth Against Municipal Ownership.**—Municipal ownership of the lines of the Duluth-Superior Traction Company in Duluth, Minn., was rejected two to one at the city election on March 31. The vote really was to ascertain the sentiment of the people with respect to the making of a valuation of the railway property with a view to acquiring the lines by negotiation and purchase. On April 1, Superior, Duluth's sister city, overwhelmingly indorsed the purchase of the local water and gas, the electric light and power plants.

**New Albany Mechanics Strike.**—The linemen and substation men of the United Gas & Electric Company, the Louisville & Northern Railway & Lighting Company and Louisville & Southern Indiana Traction Company, which are operated under one system, went on strike recently. The men demand back pay from last October, while the company has paid an increase only since March 4, when the War Labor Board decided the matter. The company contends that it is not responsible for back pay from the time the protest was lodged.

**Cleveland Subway Report Expected.**—The Rapid Transit Commission of Cleveland, Ohio, which started an investigation a year ago to find the best subway system for Cleveland, expected

to meet during the week ended April 12 to make a final report. Four tentative plans for the subways include underground tracks from the Public Square to East Ninth Street on Euclid Avenue, between the same points on Superior Avenue, from the Public Square to the Central Market district on Ontario Street and an extension of the tube from the high level bridge to the Square.

**Brooklyn Motorman Acquitted.**—Edward Luciano, motorman of the Brooklyn (N. Y.) Rapid Transit Company train in the Malbone Street tunnel disaster, was acquitted of manslaughter on April 4 after the jury had been out nearly five hours. The prisoner was at once discharged by Justice Seeger. District Attorney Lewis did not say whether he would go on with the prosecution of Col. Timothy S. Williams, John J. Dempsey, John H. Hallock, and William S. Menden, officers of the company, who were also indicted for manslaughter and now await trial, but his attitude was taken to indicate that he considered it hopeless to proceed with these trials.

**Municipal Ownership Bill Reported.**—Amended in many particulars, the Fowler municipal ownership bill, sponsored by the State Conference of Mayors, was favorably reported on April 9 by the public service committee of the New York Senate. Under one of the amendments, the consent of the Public Service Commissions would not be required for the acquisition of public utilities, the commissions being given only power to assist in determining a fair valuation of the properties. It is understood that as amended the measure has the support of New York City authorities, who objected to the broad powers vested in the Public Service Commissions in the original draft.

## Programs of Meetings

### National Electric Light Association

The forty-second convention of the National Electric Light Association will be held at Atlantic City, N. J., on May 19-22, 1919. The meetings will be held on the Million Dollar Pier, where there will also be an exhibit of electrical apparatus and supplies, supplemented by a special exhibit under the auspices of the lamp committee illustrating the evolution and application of the tungsten lamp.

### Central Electric Railway Association.

The Central Electric Railway Association will hold a boat trip this year. The steamer *South American* will leave Toledo, Ohio, on June 30 at 9 o'clock. The party will go to Detroit on Monday and up the river into Lake Huron, spending Tuesday in Georgian Bay. Mackinac Island will be reached on Wednesday morning and Benton Harbor Thursday morning. The route will thence be to Chicago which city will be reached about 4 p. m. Thursday, July 3.



# Financial and Corporate

## London Traffic Heavy

**English Group Show 16 Per Cent Advance in Gross Revenues and 21 Per Cent in Net Revenues**

For the year ended Dec. 31, 1918, the combined gross revenue of the five operating subsidiaries of the Underground Electric Railways of London, Ltd., London, England, was £7,743,451, a gain of £1,081,589 or 16.2 per cent over 1917. In spite of high prices and scarcity of labor, the companies distributed higher dividends than for a long time past, the two main reasons being an ever increas-

by the five companies is estimated to have been 901,000,000, exclusive of through inward passengers to the Metropolitan District Railway from other railways controlled by the government. Owing to the Metropolitan District Railway being under such control, the average fare per passenger for the five companies is not given.

An arrangement has been made between the Central London Railway, the London Electric Railway and the City & South London Railway, whereby the London Electric Railway bears all the expense of maintaining and operating the three railways, receiving advances

DISPOSITION OF NET INCOME OF LONDON LINES FOR CALENDAR YEAR 1918

	Metropolitan District Railway	London Electric Railway	City & South London Railway	Central London Railway	London General Omnibus Company, Ltd.
Balance forward from 1917.....	£29,029	£30,656	£21,266	£11,147	£38,548
Net income.....	583,703	650,604	152,404	227,571	595,553
	£612,732	£681,260	£173,670	£238,718	£634,101
Interest, rentals and other fixed charges.....	347,971	299,150	47,003	59,633	108,412
Balance.....	£264,761	£382,110	£126,667	£179,085	£525,689
Reserve for contingencies and renewals.....	35,000	35,000	25,000	20,000	285,000
Dividends.....	198,430	313,506	72,100	141,000	179,758
	£31,331	£33,604	£29,507	£17,185	£60,931
Further reserve for contingencies and renewals.....	£10,000	£10,000	£5,000	.....	.....
Balance carried forward to 1919.....	£21,331	£23,604	£24,567	£17,485	£60,931

ing volume of traffic and in some cases an increase in fares.

The aggregate amount retained by the five companies for "revenue liabilities," which include working expenses, prior charges, reserves and other items of a similar nature, as outlined in the London electric railway facilities act of 1915, was £7,111,760. This was an advance of £970,234 or 15.8 per cent over 1917. The gain in revenues from more traffic and slightly higher fares, however, was sufficient to give a net balance of £831,690 for 1918 as compared to £520,336 for 1917, an advance of £111,354 or 21.4 per cent.

This net amount in each year was credited to the "common fund." This fund, in accordance with the agreement of 1915, was apportioned among the five companies as follows: City & South London Railway, 6 per cent; Central London Railway, 20 per cent; London Electric Railway, 30 per cent; Metropolitan District Railway, 12 per cent, and London General Omnibus Company, 32 per cent. The accompanying table shows briefly how the net income was used.

The traffic carried by each of the four railway companies was exceedingly heavy in 1918, and arrangements have been made to obtain delivery as soon as possible of rolling stock, some of which was ordered in 1914. The total number of passengers carried in 1918

from time to time as necessary. At the close of each year the total expenses are allocated on an agreed statistical basis. It is thus possible to deal with the maintenance and operation of the three tube railways as if in fact they were one railway, and considerable economies in the keeping of accounts are being effected.

Many of the omnibuses of the London General Omnibus Company were taken over by the government, and the remainder require replacement. The company has in hand, in capital and reserve funds, £2,300,000 toward the reinstatement of the whole lot. During 1918 this company acquired a controlling interest in the Associated Omnibus Company, Ltd., and subsequently agreed to purchase its entire undertaking.

## International Defaults Interest

Preliminaries have been started by the bondholders' committee of the International Traction Company of New Jersey, to take over the stock of the International Railway, Buffalo, N. Y. Elliott C. McDougal, president of the Bank of Buffalo and chairman of the protective committee, says that something must be done immediately by the city or State to help the International Railway to increase its gross income to prevent a multiplicity of court actions.

On April 1, the International Traction Company defaulted in the payment of interest on \$16,500,000 of bonds covering the property of the International Railway. The interest was due on Jan. 1, 1919, and on April 1 the ninety days of grace expired. As collateral for the bond issue, the International Traction Company holds the capital stock of the International Railway.

The proceedings started by the bondholders of the International Traction Company do not mean receivership, according to views expressed by Mr. McDougal, but simply the sequestration of the stock of the railway company, with the present bondholders of the traction company becoming stockholders of the railway. Mr. McDougal is quoted as follows:

Under the law we would have the right to sell the railway at public auction. We are trying to adjust matters so this will not have to be done. The bondholders do not seek a costly litigation. They simply want protection for their money and action to rehabilitate the system.

## York Expenses Up

The increases in cost of operation which the York (Pa.) Railways experienced in the year ended Nov. 30, 1917, were continued during the latest fiscal year. The receipts, however, did not materially gain, and about the middle of the year the company reached the point where the traffic was on the decrease, largely on account of the number of men withdrawn for military service. Moreover, both the railway and the lighting receipts were seriously affected by the influenza epidemic.

The gross earnings for the fiscal year ended Nov. 30, 1918, at \$1,091,711 showed an increase of \$40,239 or 3.8 per cent over those for the preceding year. While taxes at \$85,160 showed a slight decrease, the operating expenses at \$598,809 and the allowance for depreciation at \$74,529 took such a jump that the total expenses increased by \$102,685, or 15.6 per cent, to \$758,498. The net earnings at \$333,213, therefore, fell off \$62,445. This loss was increased by a slight rise in interest and bond discount to \$252,195, so that the net income at \$81,018 represented a loss of \$63,000.

A 6-cent fare and a 25 per cent increase in freight rates became effective on Aug. 8, 1918, with the result that August showed a 10 per cent increase in railway gross receipts; September, an increase of 14 per cent; October (owing to the influenza), a decrease of 16 per cent, and November, an increase of 13 per cent. A change in working conditions leading to increased labor costs necessitated a further increase in fare, and a 7-cent fare with four tickets for a quarter became effective on Nov. 20.

The total cost of new construction for the latest fiscal year was \$75,281. Of this amount \$49,442 was for the railway department. The surplus balance on Nov. 30, 1918, after the payment of \$80,000 in dividends, was \$241,931.



## Higher Fare Stems Tide

### Rising Costs in Cleveland Stopped by Franchise Amendment— Interest Fund in Last Half of 1918 Starts Slowly Up

The outstanding point of the experiences of the Cleveland (Ohio) Railway for the calendar year 1918 was its final success in securing a fare which reversed the tendency of the interest fund to disappear in the face of higher costs of operation. The interest fund dropped below the franchise minimum of \$300,000 in November, 1917, and it has since remained below that sum. The payment in July, 1918, of the increased wages from May 1 overdrew the fund nearly \$250,000, but gains were gradually made under a higher fare until on Dec. 31 there was a balance of \$23,700 to the good.

#### FARES CHANGED FREQUENTLY

On Dec. 26, 1917, rate "c" (4 cents cash fare, three tickets for 10 cents, 1-cent transfer, no rebate) was placed in effect. This was continued until April 3, 1918, when rate "b" (4 cents

cash fare, seven tickets for 25 cents, 1-cent transfer, 1-cent rebate) was installed. After seven-days' trial resort was had to the final rate "a" (4 cents cash fare, seven tickets for 25 cents, 1-cent transfer, no rebate). The subsequent heavy increase in wages, however, necessitated an amendment to the Tayler grant to permit still higher fares, and on Aug. 4 rate "2" (5 cents cash fare, five tickets for 25 cents, 1-cent transfer, no rebate) became effective. This rate is still used. The fare amendment is effective until six months after the end of the war. When the interest fund exceeds \$700,000, the city has the right to ask for a fare reduction.

The transportation revenue during 1918 increased \$2,145,505 or 21.41 per cent, to which were added gains of \$6,560 or 6.13 per cent in revenue from other railway operations and \$24,655 or

30.67 per cent in non-operating income. The total income, therefore, rose \$2,187,435 or 21.33 per cent.

#### HIGHER COST ALLOWANCES

The increase in the expenditures for maintenance and operation, including the amount charged off for obsolete equipment, was \$1,409,477 or 17.43 per cent. This was brought about mainly by increases of 25.13 per cent in maintenance of equipment, 34.26 per cent in conducting transportation and 41.98 per cent in obsolete equipment. The taxes increased 12 per cent and the interest charges 3.5 per cent.

The Council, early in 1918, increased the ordinance allowance for maintenance 1 cent and the operating-expense allowance  $1\frac{1}{2}$  cents per car-mile, both dating from Jan. 1. Later the operating-expense allowance was raised 3 cents more, from May 1. The special allowances of the year, to make good the insufficient allowances of earlier years for maintenance and operating expenses and to provide for the disappearance of obsolete or wornout property, amounted to \$1,413,370, an increase over the previous year of \$373,768 or 36 per cent.

#### WAR SHORTAGE CUT SERVICE

The ordinance car-miles (with trailers at 60 per cent) in 1918 totaled 35,081,583 and the actual car-miles 36,875,603. The fares numbered 273,944,346, transfers, 1,603,495 and deadheads 1,603,495—a total of 375,570,360 rides, equal to those in 1916. The service, measured in ordinance car-miles, was 2 per cent less than in 1917. It varied monthly, from an increase of 3 per cent in May to a decrease of 6 per cent in November. These decreases in service were due mainly to the company's inability to get men to run the cars. There were fewer rides, however, than in 1917 by 5.73 per cent. The monthly differences varied from an increase of 1 per cent in March to a decrease of 17 per cent in December.

#### CAPITAL ACCOUNT INCREASED \$577,091

The Cleveland Railway in 1918 spent \$577,091 on capital account. The expenditures for viaduct improvement amounted to about \$125,000. New cars cost about \$240,000. The company spent \$40,000 for additional sub-station equipment, \$4,700 for improvements at the viaduct power-station, nearly \$20,000 for extensions of tracks and buildings, and \$3,500 for changes in operating stations necessitated by the employment of women as conductors.

In regard to the future the annual report says in part:

There will be some delay in bringing industry back from the abnormal conditions of the war period. There will probably be some unemployment, varying in duration and extent in different occupations. The seriousness of this period of readjustment upon the business of the company will depend, of course, upon how long a time shall elapse before the restoration of manufacturing and other businesses to the steadier conditions that prevailed in 1913 and earlier years.

The cost of living will decline, but the decline will not be sudden. The return of the soldiers to their old employments, or to new employments, and the transfer of men and women from the work of producing

#### COMPARATIVE INCOME STATEMENT OF CLEVELAND RAILWAY FOR CALENDAR YEARS 1917 AND 1918

##### I—Based on Ordinance Allowances

	1918		1917	
	Amount	Cents per Car Mile	Amount	Cents per Car Mile
Operating revenues:				
Revenue from transportation.....	\$12,225,385	.....	\$10,069,164	.....
Revenue from other operations.....	113,521	.....	106,961	.....
Total operating revenues.....	\$12,338,906	35.17	\$10,176,125	28.41
Expense allowances:				
Maintenance.....	\$2,078,713	5.92	\$1,770,074	4.94
Operating.....	6,438,290	18.35	5,194,275	14.50
Total.....	\$8,517,003	24.27	\$6,964,349	19.44
Balance.....	\$3,821,903	10.90	\$3,211,776	8.97
Special allowances.....	1,413,371	4.02	1,039,602	2.90
Net operating revenue.....	\$2,408,532	6.87	\$2,172,174	6.07
Non-operating income.....	105,044	.29	80,388	.22
Gross income.....	\$2,513,576	7.16	\$2,252,562	6.29
Taxes.....	720,413	2.05	643,107	1.80
Net income.....	\$1,793,163	5.11	\$1,609,455	4.49
Interest.....	1,995,500	5.69	1,928,856	5.38
Deficit.....	\$202,337	.58	\$319,401	.89

##### II—Based on Actual Expenses

Operating revenues.....	\$12,338,906	35.17	\$10,176,125	28.41
Actual expenses:				
Maintenance of way and structures.....	\$1,117,294	3.18	\$1,089,883	3.04
Maintenance of equipment.....	1,184,517	3.38	946,604	2.64
Maintenance of power plant.....	60,906	.17	32,211	.09
Total maintenance.....	\$2,362,717	6.73	\$2,068,698	5.77
Power.....	\$2,138,999	3.25	\$1,094,942	3.06
Conducting transportation.....	3,877,569	11.05	3,120,295	8.71
Traffic.....			500	.....
General and miscellaneous.....	1,372,530	3.91	1,277,902	3.57
Total operating.....	\$6,389,098	18.21	\$5,493,639	15.34
Total expenses.....	\$8,751,815	24.94	\$7,562,338	21.11
Balance.....	\$3,587,091	10.23	\$2,613,787	7.30
Obsolete property.....	744,000	2.12	524,000	1.46
Net operating revenue.....	\$2,843,091	8.11	\$2,089,787	5.84
Non-operating income.....	105,044	.29	80,388	.22
Gross income.....	\$2,948,135	8.40	\$2,170,176	6.06
Taxes.....	720,413	2.05	643,109	1.79
Net income.....	\$2,227,722	6.35	\$1,527,067	4.27
Interest.....	1,995,501	5.69	1,928,856	5.39
Surplus.....	\$232,221	.66	\$*401,788	1.12

\* Deficit.



munitions of war to other occupations, may result in such a large increase in the number of workers in advance of the possibility of their employment during the readjustment period that a decrease in rates of wages may follow.

Contingent upon the increased fare received, large increases in wages were granted to the employees of the company. These advances absorbed the

COST STATISTICS OF CLEVELAND RAILWAY FOR CALENDAR YEARS 1914 TO 1918

	Cents per Car-Mile					Cents per Fare				
	1914	1915	1916	1917	1918	1914	1915	1916	1917	1918
Maintenance expenses..	5.97	5.27	5.66	5.77	6.74	0.8379	0.7104	0.7039	0.7119	0.8647
Obsolete equipment....	0.37	0.64	1.13	1.46	2.12	0.0521	0.0869	0.1408	0.1803	0.2723
Total.....	6.34	5.91	6.79	7.23	8.86	0.8900	0.7973	0.8447	0.8922	1.1370
Operating expenses....	12.22	12.56	14.00	15.34	18.21	1.7168	1.6952	1.7382	1.8905	2.3383
Taxes.....	1.44	1.50	1.71	1.80	2.05	0.2029	0.2030	0.2124	0.2213	0.2636
Int. on bonds and notes.	0.95	0.88	0.91	0.87	0.84	0.1328	0.1185	0.1125	0.1075	0.1089
Interest on capital stock	4.32	4.85	4.74	4.51	4.84	0.6068	0.6538	0.5889	0.5562	0.6214
Total cost.....	25.27	25.70	28.15	29.75	34.80	3.5493	3.4678	3.6667	3.4967	4.4692
Gross income.....	23.93	26.34	28.34	28.63	35.47	3.3611	3.5535	3.5189	3.5295	4.5542
Surplus.....	1.34*	0.64	0.19	1.12*	0.67	0.1882*	0.0857	0.0222	0.1382*	0.0850

\*Deficit

### Rhode Island Bill Hearing

At a joint public hearing held before the corporations committees of the House of Representatives and the Senate of the Rhode Island Legislature, the passage of the bill chartering the United Electric Railways, designed to become the holding company of all the electric railway properties in the State, was urged as a public necessity.

Attorney General Herbert A. Rice, who drafted the bill at the request of the receivers for the Rhode Island Company, appeared at the hearing and explained that the transportation affairs in the State have come to a crisis and that a reorganization is absolutely essential if the public is to be served. The act, he said, was merely a vehicle to permit the reorganization and the fact that the charter is to be issued to three State officials, including the Governor, indicated that the public's rights would be adequately safeguarded until such a time as an effective and satisfactory reorganization of the properties was completed. He ridiculed the idea of public ownership. The present plight of the Rhode Island Company he attributed largely to conditions arising out of the war.

The hearing was largely attended and although about a dozen expressed their opinions, there was no adverse comment. The general belief was that the time had come for some drastic action if service is to be continued and the passage of the bill, safeguarded so satisfactorily, offered the best solution of the problem.

### Interest Payment Postponed

The Indianapolis Traction & Terminal Company, Indianapolis, Ind., has temporarily postponed payment of the interest on its \$5,000,000 of first mortgage 5 per cent bonds, which was due on April 1. In the circular issued to the bondholders under date of March 24, the company recites the difficulty it experienced in obtaining a hearing before the Public Service Commission of Indiana to obtain the discontinuance of its low rate ticket fares and the granting of a 5-cent cash fare, which was not obtained until October, 1918, after a year's delay in the courts.

greater part of all the relief granted.

The circular states that it is not unreasonable to hope that the increase in fares granted by the commission, together with a continued improvement in the business of the company, will yield a sufficient return to permit the payment of the bond interest as soon as the large expenditures have been completed covering rebuilding of equipments, conversion of the car equipments for prepayment service, installation of fare boxes and other improvements.

### St. Louis Results Still Unsatisfactory

The report of operations of the United Railways, St. Louis, Mo., for February, made by President Richard McCulloch to the Public Service Commission, points out the following:

That in the nine months in which the 6-cent fare has been in effect, the rate increase of 20 per cent produced only 14.41 per cent more revenue, while the number of paying passengers decreased 4.40 per cent.

That an estimate of twelve months' operation under the 6-cent fare, based on figures for nine months, indicates the city lines will fall short \$821,560 of earning 6 per cent on an investment of \$52,800,000.

That the county lines, on the same basis, will fall to earn 6 per cent on an investment of \$7,200,000 by \$734,895.

That the total by which the city and county lines will fall to earn 6 per cent on an investment of \$60,000,000 is estimated at \$1,556,455.

### Praise for Receiver Meloon

The work of W. G. Meloon as receiver of the Portsmouth, Dover & York Street Railway, Portsmouth, N. H., is coming in for public recognition. The Portsmouth Herald of March 19 said:

From a generally run-down electric railway to a full service equipment in much less than a year, has been the record of W. G. Meloon, receiver of the Portsmouth, Dover & York Street Railway Electric Lines. The service on the lines across the river has been fully restored and what was once in bad shape is now thoroughly overhauled and service at all times to meet the public demand is being rendered.

The war found the line with run-down equipment and inadequate cars, but this has all been overcome. Courteous employees man all the cars and good time is maintained. The road will be constantly improved from day to day. The public has noted the steady gain and this paper is glad to say a good word for a road that means so much to this territory.

The traveling public can assist in this good work by doing their part. Electric lines belong to the people and it is up to the people to help keep them as near perfect as possible.

## Financial News Notes

### Foreclosure Proceedings Begun.—

The underlying bondholders of the Southern Traction Company, a subsidiary of the Pittsburgh (Pa.) Railways, have begun legal proceedings for the foreclosure of the \$4,000,000 of first mortgage bonds of the company.

### Increase in Common Stock.—The

stockholders of the Charleston Consolidated Railway, Gas & Electric Company, Charleston, Ill., have voted to increase the authorized common stock by the issuance of 30,000 shares. The stockholders have until April 19 to subscribe to the new stock, par value \$50, pro rata.

### Wants Receiver at Chattanooga.—

Application for a receiver for the Chattanooga Railway & Light Company, controlled by the Clark interests, of Philadelphia, has been filed in the United States District Court by the Commercial Trust Company, Philadelphia, Pa., representing the holders of \$2,790,000 of the company's first mortgage bonds.

### Wants to Refund W. F. C. Loan.—

The United Railways, St. Louis, Mo., has applied to the Missouri Public Service Commission for permission to issue \$2,160,000 of 7 per cent notes, the proceeds of which will apply to the payment of the \$3,235,000 loan granted by the War Finance Corporation. The commission was expected to act on the matter on April 7.

### Will Pay on Deferred Coupons.—

Holders of the general mortgage 4½ per cent bonds of the New Orleans Railway & Light Company, New Orleans, La., have been notified that the Jan. 1 coupons will be paid upon presentation at the office of the New York Trust Company, New York. Three months' interest in addition to the amount of the coupons will be paid.

### Memphis Note Holders Organize.—

Owners of the two year 6 per cent collateral notes of the Memphis (Tenn.) Street Railway, which passed into the hands of a receiver in January, have formed a protective committee consisting of Mortimer N. Buckner, J. C. Neff, S. F. T. Brock, Charles Counselman, George T. Ordway and John A. Langan. Holders of the notes are urged to deposit them with the New York Trust Company under an agreement dated March 12, 1919.

### Mr. Lippincott a P. S. C. Director.—

At the annual meeting of the stockholders of the Public Service Corporation of New Jersey, Newark, N. J., on April 7, Heulings Lippincott, Camden, was elected a director to succeed Horatio G. Lloyd, Philadelphia, resigned. The other directors were re-elected. At the annual meetings of the subsidiary



companies, the Public Service Railway, the Public Service Electric Company and the Public Service Gas Company, retiring directors were re-elected.

**Income Bond Interest Passed.**—As a result of the showing of the Chicago (Ill.) Railways for the fiscal year ended Jan. 31, 1919, the directors of the company on April 2, by taking no action in the matter, passed the annual interest of 4 per cent payable on May 1 on the \$2,500,000 of income bonds. The meeting on April 2 was the regular date for voting this interest, but since it was not earned it will not be paid.

**Short Illinois Road Leased.**—The Rock Island Southern Railway, Monmouth, Ill., has leased the Galesburg & Western Railroad and will operate both lines as a single system. The Galesburg & Western Railroad was formerly the Rock Island Southern Railroad, operating from Galesburg to Monmouth. The Rock Island Southern Railway operates from Monmouth to Rock Island. In order that the different companies might not be confused the name of the Rock Island Railroad was recently changed to the Galesburg & Western Railroad. There will be no change in the personnel.

**Sale of Municipal Railway Bonds Proposed.**—The utilities committee of the City Council of Seattle, Wash., has recommended the sale of \$150,000 of electric railway bonds, to facilitate the making of necessary improvements in the operation of the railway system recently taken over by the city from the Puget Sound Traction, Light & Power Company. The committee has recommended the construction of tracks to connect with both ends of the Eastlake Bridge, and the loan of money from the general fund to the railway construction fund to keep the work going until the bonds are sold.

**Receiver for Jackson Company.**—The Jackson Light & Traction Company, Jackson, Miss., a subsidiary of the American Public Utilities Company, Grand Rapids, Mich., has filed a

petition in bankruptcy and E. E. Hindman, an attorney of Jackson, has been named receiver by Federal Judge Edwin Holmes. Electric railway service was discontinued temporarily, but has been resumed on order from the court. Officials of the company have been striving to increase power, light and gas rates and to raise fares to 7 cents, but the City Commission demanded that service be improved without increasing rates.

**Cities Service Stock Increase Approved.**—At the annual meeting of the Cities Service Company, New York, N. Y., held on April 8 in Dover, Del., all retiring directors were re-elected. The new board will meet for organization in New York on April 16, when it is expected the present officers will be re-elected. The stockholders of the company approved the increase in the authorized amount of preferred capital stock from \$100,000,000 to \$150,000,000. This stock will be held for future corporate requirements of the company, including the conversion of \$30,000,000 principal amount of 7 per cent convertible gold debentures now outstanding.

**\$200,000 Note Issue Approved.**—The Board of Public Utility Commissioners of New Jersey has approved the application of the Trenton & Mercer County Traction Corporation, Trenton, for the issuance of \$200,000 of five year 6 per cent guaranteed gold notes in accordance with the trust agreement of March 1 last. The company needs the money for improvements, included among which are the following: Carhouse, \$12,000; new unit at power house, \$20,000; oil reservoir and time clock at the carhouse, \$7,000; carpenter shop machine tools, \$3,000; additional power house equipment, \$10,000; ten air equipments for cars, \$4,600; J. G. White, appraisal, \$5,000; eighty-five fare boxes, \$6,375.

**Interborough-Metropolitan Engineering and Accounting Inquiry.**—G. M. P. Murphy, chairman of the protective committee for the holders of the Inter-

borough-Metropolitan Company, New York, 4½ per cent bonds, has sent out a circular to holders of the bonds calling attention to the fact that interest due on April 1 has been defaulted. The circular states the position of the holders of the bonds, and adds that the committee has arranged for a thorough investigation of the property by the engineering firm of Stone & Webster and by Price, Waterhouse & Company, certified accountants. It was stated that when the reports were received the committee would endeavor to form some plan for reorganization.

**Common Stock Dividend Passed.**—At their meeting on April 2 the directors of the United Railways & Electric Company, Baltimore, Md., failed to declare any dividend on the common stock for the present quarter, and postponed action on the dividend until July. For the month of February the company in its report to the Public Service Commission actually shows a deficit of \$50,077 in fixed charges. The item of "fixed charges" includes the interest on the 5 per cent funding bonds and on the income 4s. The interest on the income 4s, in accordance with the indenture, is payable only if earned, but it has long since come to be regarded as an actual fixed charge, and is cumulative. The report shows that for the month of February the company carried 17,540,547 cash fare passengers, and 6,125,681 transfer passengers. The report also shows that approximately 75 per cent of the gross income was distributed directly to service rendered the public and to taxation. Nelson, Cook & Company, Baltimore, bankers, in commenting on the affairs of the company in their weekly review dated April 5, said: "We do not for a moment consider that the United Railways & Electric Company is in danger of receivership; but we do think that when the experts now going over the company's books present the final results to the Public Service Commission, the necessity for prompt action will be clear cut and convincing."

## Electric Railway Monthly Earnings

### AURORA, ELGIN & CHICAGO RAILROAD, AURORA, ILL.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Feb., '19	\$179,364	*\$152,362	\$27,002	\$38,822	†\$11,820
1m., Feb., '18	140,915	*123,039	17,786	35,654	†17,778
2m., Feb., '19	366,018	*319,628	46,390	77,622	†31,232
2m., Feb., '18	268,587	*279,319	†732	17,305	†72,037

### CITIES SERVICE COMPANY, NEW YORK, N. Y.

1m., Feb., '19	\$1,767,276	\$58,096	\$1,709,180	\$150,099	\$1,559,081
1m., Feb., '18	1,849,610	33,521	1,816,089	213	1,815,876
12m., Feb., '19	22,019,868	576,817	21,443,051	530,261	20,912,790
12m., Feb., '18	19,579,248	368,180	19,229,068	2,681	19,226,387

### CLEVELAND, PAINESVILLE & EASTERN RAILROAD, WILLOUGHBY, OHIO

1m., Jan., '19	\$47,536	*\$33,477	\$14,059	\$16,118	†\$2,059
1m., Jan., '18	40,772	*27,973	92,799	11,321	1,478

### FEDERAL LIGHT & TRACTION COMPANY, NEW YORK, N. Y.

1m., Jan., '19	\$333,629	*\$235,873	\$97,756	\$52,099	\$45,657
1m., Jan., '18	310,344	*212,003	98,341	50,184	48,157

### INTERBOROUGH RAPID TRANSIT COMPANY, NEW YORK, N. Y.

1m., Feb., '19	\$3,499,170	*\$2,361,834	\$1,137,336	\$1,548,037	†\$364,638
1m., Feb., '18	3,256,310	*1,812,533	1,443,777	1,171,141	324,159
8m., Feb., '19	27,265,978	*19,030,215	8,235,763	11,828,122	†3,197,327
8m., Feb., '18	26,494,347	*14,871,566	11,622,781	8,823,332	3,153,799

\* Includes taxes.

† Deficit.

### LAKE SHORE ELECTRIC RAILWAY, CLEVELAND, OHIO

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Jan., '19	\$191,454	*\$152,434	\$39,020	\$35,840	\$3,180
1m., Jan., '18	141,554	*115,307	26,247	36,025	†9,878

### NEW YORK (N. Y.) RAILWAYS

1m., Jan., '19	\$962,263	*\$878,817	\$83,446	\$280,028	†\$153,155
1m., Jan., '18	865,377	*720,601	144,776	287,627	†92,933
7m., Jan., '19	6,561,098	*5,811,051	750,047	1,947,335	†891,283
7m., Jan., '18	7,171,482	*5,418,664	1,752,818	1,978,796	†132,634

### SAVANNAH (GA.) ELECTRIC COMPANY

1m., Jan., '19	\$114,114	*\$89,991	\$24,123	\$26,579	†\$2,456
1m., Jan., '18	93,374	*63,183	30,191	25,210	4,981
12m., Jan., '19	1,203,631	*882,959	320,672	304,317	16,355
12m., Jan., '18	986,494	*657,868	328,626	291,680	36,946

### TAMPA (FLA.) ELECTRIC COMPANY

1m., Jan., '19	\$104,648	*\$59,808	\$44,840	\$5,295	\$39,545
1m., Jan., '18	86,449	*52,210	34,239	5,083	29,156
12m., Jan., '19	1,080,745	*627,874	452,871	61,645	391,226
12m., Jan., '18	995,445	*568,169	427,276	56,948	370,328

### TWIN CITY RAPID TRANSIT COMPANY, MINNEAPOLIS, MINN.

1m., Feb., '19	\$829,499	\$638,641	\$190,858	\$147,167	\$43,691
1m., Feb., '18	780,372	604,534	175,838	144,919	30,919
2m., Feb., '19	1,704,083	1,303,460	400,623	309,345	91,278
2m., Feb., '18	1,622,096	1,266,698	355,398	305,435	49,963

\* Includes taxes.

† Deficit.

‡ Includes non-operating income.



# Traffic and Transportation

## Suburban Fare Readjustment

Flat Suburban Rates Suggested in Rhode Island to Replace Commutation or Excursion Fares

A flat reduction in fares on eight of the long-haul suburban lines of the Rhode Island Company, Providence, R. I., approximating 10 cents between terminals in most instances, is suggested in a new schedule of rates filed by the company on April 1 with the Public Utilities Commission. The lines affected by the proposed rates include the Buttonwoods, Chepachet, Providence-Woonsocket, Providence-Washington, East Greenwich, Riverside, Warren & Bristol, Riverpoint-Rocky Point and the Woonsocket-Pascoag lines.

### FLAT FARE CONSIDERED BETTER

The new tariffs are offered to the commission in compliance with its order that the company propose some form of excursion or commutation rate on the long-haul lines of heavy traffic. The trustees of the road believe a flat rate better for the public than the ordinary commutation or excursion rates.

The present rates will continue in effect until May 1. The proposed rates merely suggested as a basis for a readjustment of the fares on the heavily traveled suburban lines. It is suggested that they be tried for three months for the purpose of building up business, as they are lower than the company can offer on the present volume of business.

Long-haul lines upon which a fare of more than 10 cents is charged, which are not included in the changes suggested, include the Providence and Danielson, Sea View, Smithfield Avenue, Pawtucket-Crescent Park, Pawtucket-Cumberland Hill, Oaklawn and the Centerdale-Esmond, via Smith Street and Manton Avenue.

### PRESIDENT POTTER EXPLAINS

A. E. Potter, president of the company in his letter of transmittal of the tariffs to the commission, says:

A commutation rate is usually fixed by reducing the price for each zone traveled, while the rates in the accompanying tentative form of tariff effect a reduction by a lengthening of the zone.

It is believed that the submission of these reduced rates in place of commutation tickets or excursion tickets is desirable on the grounds that the experience of this company and other electric railways with tickets indicates that tickets can be handled only at a large expense for printing and for proper accounting by conductors and the auditing department, and it is believed that this expense should be obviated and the passengers given the benefit of a reduced rate which includes no expense for the printing and handling of tickets.

These rates are lower than the mileage rate of 3-cents on the steam lines as now operated by the United States Railway Administration, and are as low as or lower

than, most electric railway rates for similar service throughout New England.

These rates are lower than the company can afford to offer on the present volume of business, and are offered as an experiment for three months trial, in the hope that the lines affected will be so well patronized, on account of the low rates, that the amount derived from the business will be sufficient to cover the cost of service.

With the reduction of the fare between terminals of 10 cents on six of the eight lines, the company in its proposed rate has made a readjustment of the fares in intermediate zones by extending the length of the zones.

## Inquiry Into Des Moines Service

In an effort to prove that the Des Moines (Ia.) City Railway is not compelled by financial reason to make the cut in service recently authorized by Federal Judge Martin J. Wade the city of Des Moines has a force of experts and accountants going over the books of the company. The investigation is being conducted under the direction of Prof. E. W. Bemis, who is assisted by Walter Bemis of the Chicago Rate & Utility Company, George H. Mathews of the firm of Andrew Sangster & G. H. Mathews, and Charles H. Pugh, Chicago.

Scott Goodrell, newly-chosen railway supervisor of Des Moines, has presented a demand to the City Council for drastic changes in the service now being furnished by the Des Moines City Railway. Among other complaints Mr. Goodrell protests against the skip-stop plan and states that it has done more to cause complaint from patrons than the recent reduction of service. He urges that it be abolished. He asks the City Council to establish two car-loading berths at all important near-side stops, having them marked on the pavement. No parking of cars in these berths would be allowed, according to Mr. Goodrell's plans. Mr. Goodrell also proposes additional fare collectors on cars at congested points so that both ends of the cars could be used for loading and unloading. Protection of car-riders from motorists is also urged.

The Council has as yet taken no action of Mr. Goodrell's recommendations.

## Platform Labor More Plentiful

Platform men are available now in such numbers that the Portland Railway, Light & Power Company, Portland, Ore., is practically back to old standards of efficiency, but mechanics, machinists and painters are still so scarce that it is almost impossible to keep the force up to strength. So long as the promise is for fairly steady work at the shipyards the mechanics prefer such work.

## Ten-Cent Fare Suggested

Professor Richey Advocates Dividing Washington Into Two Five-Cent Zones

A zone system calling for the payment of an extra fare of 5 cents by patrons riding on cars into the city from the outer sections was suggested by Prof. Albert S. Richey, an expert witness for the Washington Railway & Electric Company, Washington, D. C., in the hearing before the Public Utilities Commission of the District of Columbia on the company's application for financial relief. The extra fare would be cut down to 3 cents by commutation. The zone line would be 2 1/2 miles from the center of traffic.

### RELIEF OR RECEIVERSHIP

Professor Richey was called to the stand by the company following testimony by its officers to the effect that the financial affairs of the company were in a desperate condition, and that unless relief should be granted, the company would be obliged to cease its practice of making good the deficits of the various subsidiary companies which serve the suburbs. Such a course would mean a receivership for these lines.

Professor Richey said that a zone system of fares as outlined by him, together with a 1-cent charge for all transfers, would realize the company additional revenue of about \$600,000 a year. Patrons riding wholly within either zone would pay a fare of only 5 cents. Those crossing the zone line would be charged an additional fare of 5 cents, but this would be cut down by the issuance of commutation tickets for 3 cents each. The commutation tickets would avoid the necessity of making change at the zone line and insure a rapid and easy collection of the extra fares. The witness said that such a system was working successfully at Springfield, Mass., and Holyoke, Mass., and that a similar plan had been worked out for Boston, but had not yet been put in operation in that city.

### PRESIDENT HAM'S VIEWS

William F. Ham, president of the company, testified that in his opinion the only solution of the problem, provided assistance was not given the company, would be the taking over of the lines by the government and the payment of deficits out of the public purse.

When Mr. Ham completed his testimony, representatives of the citizens' associations will be heard. The latter have announced their opposition to any increase in fares and will probably suggest that the commission cannot act with fairness until after the actual valuation of the property is determined.

The commission completed the valuation hearing only a few days ago and every indication was given at the time that there would be no decision until there was a court ruling on the matter of the valuation of the Potomac Electric Power Company.



## La Crosse Six-Cent Fare Order Vacated

Circuit Court Judge Holds That Failure to Earn Fair Return on Property Value Did Not Create "Emergency"

An important decision regarding emergency fares was handed down on March 21 by Judge Ray E. Stevens of the Circuit Court of Hare County in the case of the Wisconsin Railway, Light & Power Company. The Wisconsin Railroad Commission had on Sept. 12, 1918, granted a 6-cent fare for this company in La Crosse upon the ground that an emergency existed because the old rate was insufficient to cover operating expenses, taxes and a 7½ per cent return on the property value.

Judge Stevens now holds, however, that the grant of a higher fare was unlawful because no emergency existed within the meaning of the law. His general argument is that a utility has no right to an emergency rate that will maintain its normal rate of income, and that the fact that a utility has set aside a substantial surplus is one of much weight in determining whether an emergency exists.

### RETURN ON INVESTMENT NOT CONSIDERED

After citing various cases (*Re Indianapolis Water Company*, P. U. R. 1919, A448,460; *re Lincoln Traction Company*, P. U. R. 1919, D168-171; *re Public Service Railway*, P. U. R. 1918, E910,915; *re The Milwaukee Electric Railway & Light Company*, 18 W. R. C. R. 681,685; *State vs. Lewis (Ind.)*, P. U. R. 1918, F111,118), Judge Stevens remarks that it is not suggested in any of these cases that the failure to pay a return on the fair value of the property is an element to be considered in determining whether an emergency exists. No single fact, in his opinion, is more thoroughly established than that a utility has no right to an emergency rate that will maintain its normal rate of income. (*Re Empire Gas & Electric Company (Mass.)*, P. U. R. 1918, D912; *re Long Island Railroad (N. Y.)*, P. U. R. 1918, A649, 654; *re Public Service Railway*, P. U. R. 1918, E910, 915; *re Queens Borough Gas & Electric Company*, P. U. R. 1918, F672, 881.)

Judge Stevens found but one case in which returns on capital invested were considered in fixing emergency rates, and then only upon the ground that such returns were essential to "sustain its credit . . . to the end that essential capital for additional facilities to meet the public demands or needs may be secured upon reasonable terms." (*Re Georgia Railway & Power Company*, P. U. R. 1918, F624, 632.) There is no proof, he says, that capital is needed to make extensions or procure additional facilities to serve the public at La Crosse. Even under such a state of facts the most that should be considered in determining whether an emergency existed is the amount of interest payable upon the funded debt properly chargeable to the

electric railway property, but not a return of 7½ per cent on the value of the property.

### RAILWAY AND LIGHTING SURPLUS AFFECTS CASE

During the six years 1913-1918 the company, after deducting operating expenses, taxes and depreciation, earned an average of 7.03 per cent on the property value. On June 30, 1916, it had a surplus of \$111,626, and on June 30, 1918, a depreciation reserve of \$93,797 and a sinking fund reserve of \$22,249. In October and November, 1918, the operating revenues under the new 6-cent fare exceeded operating expenses and taxes by only \$1,129, an amount insufficient to provide for 3 per cent depreciation.

Judge Stevens believes that under such a financial record it cannot be said that an emergency existed. He adds that the setting aside of a substantial surplus is a fact of much

weight in determining the existence of an emergency and that no commission has stated the rule more clearly than the Wisconsin Railroad Commission, when it said:

Where a utility has been able to accumulate a proper surplus after meeting the charges entering into the cost of service, including a fair return on the investment, consumers may be said to have insured the utility against fluctuating conditions of a more or less temporary nature. In such cases, in order that emergency relief might reasonably be granted by the commission, there would have to be a showing that the emergency alleged was of a more serious nature and the losses incident thereto greater in relation to the total business than would be required to constitute an emergency in the case of a utility which had been operating with little or no margin above the actual cost of service.

The facts found by the commission in the La Crosse case, therefore, are considered by Judge Stevens to fail to establish an emergency which threatens "serious loss or inconvenience to the public directly, or indirectly through loss to the company involved." This is the test which the Wisconsin commission prescribed in the Manitowoc Gas Company case (19 W. R. R. 832, 835), quoted above. The 6-cent fare order is therefore vacated.

## Twelve-Day Suspension in Saginaw

Peanut Politics in Fare Case Disrupts Business Life of Entire Michigan Community

Local electric railway service has been restored in Saginaw, Mich., by the Saginaw-Bay City Railway after a cessation of twelve days. To be exact the shut down lasted from midnight on March 15 to noon on March 28. The story is one in which local politics played a large part, with the railway company deciding to suspend entirely rather than submit to unreasonable demands or permit itself to be used as a buffer. It is a study in peanut politics such as has made men like Bryce doubt the efficiency of the American political system as it concerns local municipal administration.

### THE STORY UNFOLDS ITSELF

Interwoven in the story is much local history. It properly has its beginning on March 12, 1918, when the railway petitioned the City Council asking for authority to increase fares to 6 cents. At that time, the cash fare in Saginaw was 5 cents, with regular tickets at six for 25 cents and school and labor tickets at eight for 25 cents. Regular tickets were good at all times, labor tickets were accepted between the hours of 5.30 a. m. and 7.30 a. m. and 5.30 p. m. and 6.30 p. m., and school tickets were accepted from children attending public schools on school days. These rates were fixed in the franchise to the company granted on Oct. 16, 1893.

On the same date that the company filed its petition with the City Council, it began a series of educational talks in the daily newspapers, setting forth in detail all facts connected with its operation and showing why the increase in fare was necessary. The City Council engaged Prof. M. E. Cooley of the Uni-

versity of Michigan, to appraise the railway property in Saginaw and verify the statements made by the company with reference to the costs of operation, etc. A complete report upon the situation was presented to the City Council on June 24, 1918, by Professor Cooley. This report showed conclusively that the 6-cent fare requested by the company was fully justified.

Accordingly the City Council on July 2, 1918, passed an ordinance granting the company the relief asked for and establishing a straight 6-cent fare for all passengers in place of the former rates of fare. The ordinance became effective on July 16, 1918, and, on this date, the company inaugurated the 6-cent cash fare, selling tickets at the rate of five for 30 cents merely as a matter of convenience for the public.

In the fall of 1918, a vacancy occurred in the City Council and a new commissioner was elected. This new commissioner made an effort to have the City Council revoke the 6-cent fare ordinance, but his efforts were unsuccessful. He then instigated petitions providing for the submission to the people of a measure to revoke the ordinance. The charter of the city of Saginaw provides that any ordinance shall be submitted to the people if 25 per cent of the electors petition to have the same done. The new commissioner secured the requisite number of signers to the petitions and the ordinance to repeal the 6-cent fare ordinance was submitted to the electors on March 5 and was passed, to become effective on March 16.

The company had previously stated to the City Council and also to the pub-



lic through the newspapers that, if the 6-cent fare was revoked, it would be obliged to cease operation, as it was financially unable to operate at the old rates of fare. At midnight, therefore, on March 15, the cars were run into the carhouses and the operation of all city railway service in Saginaw was discontinued.

#### PERSONAL ENCOUNTER IN COUNCIL

The City Council then served notice on the company that, if service was not resumed, the franchise would be forfeited. Two days later, the City Council found that the franchise provided that thirty days' notice was necessary, in order to forfeit the grant and this action of the Council did not, therefore, tend to relieve the situation in any way. The company was still continuing to operate its interurban lines in and out of the city and the City Council then served notice upon the company that it would apply to the courts for an injunction to stop the interurban cars. This threat it was found impossible to carry out as the operation of the interurban cars could not be discontinued as long as the company held its franchise in the city.

Meanwhile the daily meetings of the City Council reflected much bitterness. Hostility was evinced toward the new commissioner by the other members of the City Council. One of these meetings ended in a personal encounter between the newly-elected commissioner and the city attorney. On the following morning the city attorney resigned, leaving the city without any legal advisor in the controversy.

The commercial and industrial life of the city was, of course, very seriously affected and a meeting of the directors and members of the Saginaw Board of Commerce and Saginaw Manufacturers' Association was held, in order to see if anything could be done to provide for the resumption of service. The business interests and other intelligent members of the community favored the retention of the 6-cent fare by the company, but the radical element bitterly opposed this course. The business interests, therefore, felt that a few days more without railway service would demonstrate to everyone the need of service and educate many people to the fact that they must pay a fair price for railway accommodations in case they wanted the company to continue to operate.

A proposition was then brought forth by the Saginaw Board of Commerce and the Saginaw Manufacturers' Association providing for the circulating of petitions asking the City Council to grant a temporary compromise rate of fare of 6 cents cash, with regular tickets at nine for 50 cents and school and labor tickets at five for 25 cents.

#### ORDER AGAIN PREVAILS

The Saginaw County War Board, which had taken charge of the different Liberty Loan and Red Cross campaigns, was called together and started out to secure the signatures of some 15,000 or 20,000 names to these petitions. Mean-

while, several days had elapsed and the City Council had retained the services of another attorney and decided to apply to the Saginaw Circuit Court for a mandatory injunction to compel the company to resume operation at the old rates of fare. Application was made to the court for this injunction on March 28, and a temporary order was issued. Service was then resumed at noon on March 28, the old rates of fare being in effect until the case is heard and a decision has been rendered by the courts.

#### Columbus Withholds Relief

The railway relief ordinance introduced in the Council of Columbus, Ohio, by Councilmen A. E. Griffin on March 17, failed of approval in Council committee session on April 4 by a vote of four to two.

The two ordinances provided for six tickets for a quarter with transfers on payment of 5-cent cash fare and the Columbus Railway, Power & Light Company had agreed that if they were passed it would spend \$500,000 for betterments. One of the ordinances covers the Central Market lines and the other remainder of the lines operated by the company.

In voting for the ordinance, Councilman Lamneck explained that he was against the 5-cent transfer provision, but did not wish to be a party to the wrecking of any industry. He asked why the issue was not submitted to a referendum. Councilman Weinland said that he was in favor of giving some form of relief to the railway but could not approve the terms embodied in the Griffin ordinance.

Charles L. Kurtz, president of the company, and John L. Wilson, its attorney, spoke in favor of the ordinances. President Kurtz said that unless relief was granted immediately the company would go hopelessly in debt and the service would suffer.

#### Pacifator Wanted for Iowa

With the end in view of bringing to a close the difficulties existing between the city of Des Moines and the Des Moines (Ia.) City Railway the Chamber of Commerce of Des Moines has petitioned the Legislature of Iowa for the appointment of a commission or other body whose duties would be to settle disputes between municipalities and their public utilities.

The petition states that a body is needed which is free from political influence to act as the judge in such cases and urges that on account of the condition now applying in Des Moines action should be taken before the adjournment of the present session of the Legislature.

The petition in part asks for a body to "fix and determine fair and reasonable rates of fare under such rules and regulations as will protect and safeguard the interests of the people and at the same time permit sufficient earnings to take care of all operating costs, reasonable depreciation and fixed

charges, and insures adequate and satisfactory service unaffected by political influence."

A bill to increase the size and powers of the present Railroad Commission of Iowa was introduced early in the present session, but was fought by the municipalities. It was withdrawn several weeks ago without reaching debate before the Legislature.

#### Commission Regulates the Jitney

The Public Service Commission of Massachusetts has issued an order amending local rules and regulations governing the operation of jitneys in Malden, Salem, Lynn, Lawrence, Haverhill, Newburyport, Brockton, New Bedford, Nahant and Swampscott. The action was taken under the statutes which give the board the power to review, approve or amend such regulations. The order consists of 19 sections, including much detail of no general interest. The principal regulations are as follows:

Jitneys shall be mechanically inspected before licenses are issued for their operation, and once every six months thereafter. They must be kept in a safe and sanitary condition at all times. Their operators shall be not under twenty-one years of age and shall pass an examination as to fitness for the work. Each vehicle shall carry signs telling its route, fare charged and schedule of trips.

Individuals or companies operating jitneys must give bonds sufficient to meet final judgments for injury or death to persons injured in consequence of accident in which the car was involved or for damage to property. The amount of these bonds shall range from \$2,500 for a vehicle seating five persons or fewer and \$500 for each additional passenger seat. Carrying more than the seating capacity of a car is prohibited. Vehicles must be operated regularly for not less than twelve consecutive hours every day, and must be equipped with extra tires, with skid chains, etc. Rules are prescribed relative to the character of operators and their deportment while operating their cars.

#### Seattle Stops Free Riding

Several of the recommendations made by Superintendent Thomas F. Murphine for improvements in the operation of the Seattle (Wash.) Municipal Railway have met with strong opposition. The announcement that no more free rides would be furnished on the municipal railway system brought a storm of protest from the members of the police and fire departments, who state that they were assured by Mayor Ole Hanson last fall that the practice of free rides for them would be continued. In a report on traction earnings submitted in October of last year, Superintendent Murphine showed that the railway lost approximately 4,000,000 fares in 1918 on account of free rides to firemen, policemen, general city employees, etc.

The proposed new traffic ordinances recommended by Mr. Murphine are also meeting with opposition. The Chamber of Commerce Civic Bureau, in opposing the measure, states that it is too drastic and would work unnecessary hardships, and expresses the belief that a more conservative amendment may be worked out that will bring satisfactory results.



## Transportation News Notes

**Wants Return to Five-Cent Fare.**—The Council of Ottumwa, Ia., has passed an ordinance recommending a return to a 5-cent fare. A 6-cent fare was allowed the Ottumwa Railway & Light Company on Dec. 23.

**One-Man Cars Considered for Boston.**—The trustees of the Boston (Mass.) Elevated Railway are making an exhaustive study of the one-man car with reference to possible use on lines of lighter traffic.

**Six Cents in Lawrence.**—The Public Utilities Commission of Kansas has authorized the Lawrence Railway & Light Company to charge 6 cents for a period of six months. At the end of that period the commission will decide whether the rate is to be continued.

**Files Ten-Cent Fare Tariff.**—The Massachusetts Northeastern Street Railway, Haverhill, Mass., has filed a tariff with the Public Service Commission proposing to increase the single cash fare from 6 cents to 10 cents, effective May 7. There will be no increase in the price of tickets.

**Six Cents in Spokane.**—The Public Service Commission of Washington has authorized the Spokane & Inland Empire Railroad and the Washington Water Power Company to charge a 6-cent fare. This order followed the request of the companies for an increase in fare from 5 cents to 7 cents.

**Ten-Cent Fare Unprofitable.**—The Tiffin, Fostoria & Eastern Electric Railway will not remove its tracks in Tiffin until the Chamber of Commerce and industrial heads hold a conference. An effort will be made to persuade the company to continue operating cars at a 10-cent fare. The company says it is losing money.

**Fare Bill Passed by Assembly.**—The so-called Carson-Martin fare bill has passed the New York Assembly with one vote to spare. This measure is designed to amend the Public Service Commission law by extending the jurisdiction of the Public Service Commissions over the rates, fares and charges of electric railways fixed by agreement with local authorities, notwithstanding limitations that are imposed in their franchises.

**Collision on Washington Interurban.**—Two interurban cars, one running from Everett and the other to Everett, met in a head-on collision at Lake Ballinger on March 24. No passengers were killed, but every one was more or less seriously injured. The impact of the two cars resulted in their being telescoped. One car was of wood, and the other of steel. The cars were the property of the Puget Sound Traction, Light & Power Company.

**Ten Cents in Yakima.**—After the hearing in regard to the proposed 100 per cent increase in fare on city passenger lines of the Yakima Valley Transportation Company, North Yakima, Wash., E. F. Blaine, chairman of the Public Service Commission, announced a rate of 10 cents cash fare, 8 cents for tickets and 4 cents for children would go into effect on April 1. Those fares will be in effect, unless a change appears necessary, for a period of one year thereafter.

**Attractive Employment Offered in Detroit.**—The Detroit (Mich.) United Railway is advertising for men available to act as motormen and conductors. The shortage is relatively as great now as it was when, owing to the scarcity of men who had joined the fighting forces or entered munition and allied plants, the way was opened for the employment of women as conductors. Since then, however, schedules have been materially increased. The opening up of other fields of endeavor has resulted in a realignment of the working forces with the result that the company has many vacancies.

**I. T. S. Increases Freight Service.**—The Illinois Traction System, Peoria, Ill., will add three fast freight trains to its service, these trains to operate between St. Louis and Peoria and St. Louis and Decatur. Officials of the Illinois Traction System found that increasing business necessitated greater hauling capacity and more especially rapid service. A fast freight will leave Peoria at 9 p. m. and will arrive in St. Louis at 6 a. m. and the same time will be made by a train running from St. Louis to Peoria. A fast freight will leave St. Louis at 9 p. m. and will arrive at Decatur at 7.30 o'clock the next morning.

**Real Estate Owners and Railways.**—P. S. Arkwright, president Georgia Railway & Power Company, Atlanta, Ga., in a recent address before the Atlanta Real Estate Board explained in detail the financial needs of his company and the reasons why home-owners should be interested in its welfare. The speech made a strong plea for the removal of the fare question from politics and for a fair settlement upon its merits. Although the Georgia Railroad Commission and the War Labor Board both emphasized the urgent need of a higher fare through a franchise modification, the City Council of Atlanta has steadily, it is said, refused to hear the company's case.

**Mobile May Ask More.**—The Mobile Light & Railway Company, Mobile, Ala., is advertising a meeting of the stockholders for April 28 to amend the charter of the company so as to eliminate reference to a fixed fare of 5 cents and to insert in lieu thereof the provision: "The compensation which shall be charged and received for the carriage of passengers shall be such as may from time to time be fixed by contract with the city of Mobile, or, in the absence of such contract, by the Alabama Public Service Commission. The

directors of the company have already adopted a resolution declaring that such amendment is desirable. It now remains only for the stockholders to act, and the company will go before the City Commission, it is expected, asking for a fare of 6 cents or more.

**Injunction in South Carolina Fare Case.**—A temporary injunction has been issued restraining the Railroad Commission and the Attorney General of South Carolina from taking steps to enforce the order of the commission relative to the rates on the Charleston-Isle of Palms Traction Company's line at Mount Pleasant, Moultrieville, Atlanticville and on the Isle of Palms. In an order promulgated recently by the Railroad Commission the petition of the Charleston-Isle of Palms Traction Company for an increase in fares was refused, and the matter was turned over to the Attorney-General to force compliance with the order of the commission of Oct. 2, 1918, directing that not more than 3 cents be charged for transportation over the railway. The company considered this unreasonable and confiscatory and appealed to the courts for relief.

**New York City's Belligerent Attitude.**—An affidavit by Corporation Counsel William P. Burr of New York City concerning the attitude of the city toward the New York Railways, now in the hands of a receiver, and the action the city will take should the Legislature vest the Public Service Commission with authority to increase fares has just been put at the disposal of the court, the receiver, the commission, and others who may have direct interest in the matter. If the Legislature acts favorably on the pending bill providing for a fare increase it will meet with the active opposition of the city and steps will be taken to test the validity of the act in the courts. There is also a warning to the receiver with regard to the attitude of the city should it be decided by the railway interests involved to segregate the properties now leased.

**Wants Increase Pending Final Determination.**—The International Railway, Buffalo, N. Y., on April 4, made an application to the Public Service Commission for the Second District, for a modification of its order suspending until April 30 interurban fares and asking that it may be permitted to put the suspended fares into operation provided the company gives a bond and makes provision to refund amounts in excess of amounts finally determined as legal fares. The commission's investigation of the tariff against which complaints were filed by Lockport, Tonawanda, North Tonawanda and La Salle was interrupted on March 27 when Justice Sears' order was served upon Chairman Hill in proceedings for a writ of prohibition against the commission and the railway. This order has since been modified. The railway claims that it has operated its interurban division at a net loss of \$116,000 a year and that the suspension order prevents the company from receiving increased fares of approximately \$23,000 a month.



## Personal Mention

### New P. R. T. Operator

**G. A. Richardson Is Made Superintendent of Transportation Following Call to Philadelphia on Special Assignment**

G. A. Richardson, general superintendent of the Puget Sound Traction, Light & Power Company, Seattle, Wash., as announced briefly in the *ELECTRIC RAILWAY JOURNAL* for April 5, has accepted the position of superintendent of transportation of the Philadelphia (Pa.) Rapid Transit Company. It is expected that he will assume the duties of his new office on April 16.

Mr. Richardson has been unusually successful in his handling of transportation matters on the Pacific Coast and on other properties with which he has been connected with the result that his

Thus he was asked to assist in connection with the affairs of the Rochester (N. Y.) surface lines, and in 1914 made an extensive investigation and report on the transportation facilities of the Chicago Elevated Railways. When F. P. Royce was made general manager of the Brooklyn (N. Y.) Rapid Transit Company, following the receivership, he summoned Mr. Richardson to New York to investigate and report as to the facilities of that company. He was unable to investigate anything but the elevated and subways, however, owing to other demands upon his time, but he gave more than a month to that work.

Mr. Richardson was born in Boston, Mass., in 1882. He was educated in the public schools of the cities of Newton and Boston, Mass., and was graduated from the Mechanic Arts High School in 1900. He returned there and took a post-graduate course in machine shop work and mechanical drafting until February, 1901, when he entered the employ of the Boston (Mass.) Elevated Railway at the Sullivan Square shops, working on the installation of electric equipment in the new elevated cars up to and shortly after the time the elevated division began operation. He was later transferred to the train service as a motorman, at the same time giving his spare time to working on car repairs with the mechanical department on surface cars at the North Cambridge carhouse, where he was located. During 1902 and 1903 he worked in the power stations of the company in various capacities. During the summer of 1903 he was transferred into the electrical engineering department and remained there until September, 1904, when he accepted a position with the Boston & Northern Street Railway as inspector of car repairs in charge of the Lynn Division. In May, 1905, he went to work for Stone & Webster as assistant superintendent of the Houghton County Street Railway, Houghton, Mich. On Nov. 1, 1906, he was promoted to the position of superintendent of that company and remained at Houghton until Jan. 1, 1910, when he was transferred to Seattle as assistant superintendent of transportation. On Dec. 1, 1910, he was promoted to superintendent.



G. A. RICHARDSON

advice and help have been solicited in connection with the solution of problems in a number of cases arising in other cities. In some of these instances he has acted merely as consultant, while in others has fallen to him the task of supervising the whole undertaking.

More than a year ago the Emergency Fleet Corporation summoned Mr. Richardson to Philadelphia to help solve the transportation problem of the Hog Island shipyard. In September, 1917, Hog Island was an uninhabited marsh on the lower Delaware with no transportation facilities, and was in this condition when it was selected as the site for the world's largest shipyard. The system of transportation devised combined steam, electric and ferry service. Five months after Mr. Richardson's visit Hog Island had 80 miles of tracks and 18 miles of roadway within the confines of the yard.

Long before his retention in connection with this work, however, Mr. Richardson's unusual talent had received recognition outside the organization with which he was permanently connected.

Assistant superintendent of transportation—R. E. Furse.

Construction and maintenance—chief engineer—J. J. Wettrick.

Mechanical department—superintendent of rolling stock and shops—A. D. Campbell, formerly with the Puget Sound Traction, Light & Power Company.

Assistant superintendent of rolling stock and shops—A. Flanigan.

General carhouse foreman—H. J. Stith.

Georgetown general shop foreman—Albert Pohl.

Accounting department—Auditor—Allan B. Hiatt.

Clerical department—head clerk—Mrs. W. J. Biggar.

Thomas F. Murphine, superintendent of public utilities of the city of Seattle, Wash., became the active head of that city's extended municipal electric railway system, with a trackage of 224 miles, on April 1, when the city completed the purchase of the railway lines of the Puget Sound Traction, Light &



T. F. MURPHINE

Power Company. Mr. Murphine was previously superintendent of the 18-mile municipal railway line which the city had installed. He thus becomes the principal operating official of perhaps the largest city electric railway system of the Pacific Coast and by far the largest municipal electric railway property in the United States. Mr. Murphine was born in Hillsboro, Ohio, on July 7, 1878, and settled in Seattle in April, 1883. He was graduated from the University of Washington at Seattle, with the degree B. A. in 1898, and from the School of Law at the University of Washington in 1907. He was a member of the 1913 and 1915 sessions of the Washington State Legislature and was a leader of the Progressive and municipal ownership forces in these two sessions. During the 1917 session of the Legislature he was Assistant Attorney General, assigned to the bill drafting department. He continued in this capacity until April 1, 1918, when he was appointed superintendent of public utilities at Seattle, by the present Mayor, Ole Hanson.

### Seattle Operating Heads Announced

Operating heads of the municipal street railway at Seattle, Wash., have been announced as follows:

Superintendent—Thomas F. Murphine.

Assistant superintendent—Edward D. O'Brien.

Superintendent of transportation—D. W. Henderson, formerly with the Puget Sound Traction, Light & Power Company.



Col. Joseph Alexander, former assistant to John J. Stanley, president of the Cleveland (Ohio) Railway, and identified with the quartermaster's department at Washington during the war, expects to be mustered out of service soon and resume his former duties with the railway.

George A. King, Newark, N. J., master mechanic of the Central division, has been made division master mechanic of the Essex division of the Public Service Railway, Newark, N. J., to take the place of C. F. Bachman. John Finton, of the Newark shops, will be the successor to King on the Central division.

J. S. Pevear of the Birmingham Railway, Light & Power Company, Birmingham, Ala., will be general manager of the operating department of the American Cities Company. Headquarters of the operating department will be opened at once in Birmingham by Mr. Pevear. The American Cities Company operates public utilities in Birmingham, New Orleans, Memphis, Little Rock, and other cities. The operating headquarters have heretofore been in New Orleans.

Harry H. Hansen has been appointed general superintendent of the Middlesex & Boston Street Railway, Newtonville, Mass. Mr. Hansen's work has been previously identified with the Boston (Mass.) Elevated Railway transportation department service. He was assistant to the superintendent of rapid transit lines at the time of his departure from the Boston company, and had worked his way upward from a conductor's berth through the superintendency of various divisions on the surface system before becoming associated with the rapid transit division of the service.

David W. Henderson, for seven years head of the transportation department of the Puget Sound Traction, Light & Power Company, Seattle, Wash., has been made superintendent of transportation of Seattle's municipal electric railway system. Next to the general superintendency, which position Mr. Murphine, the city superintendent of public utilities, will fill, the post is the most important connected with the operation of the enlarged city railway system. Mr. Henderson has been with the Puget Sound Traction, Light & Power Company, in various capacities, for seventeen years. He was born in Dumfermline, Scotland, in 1873, and came to America with his parents in 1881. He lived at Randolph, Wis., until he went to Seattle in April, 1902. His connection with the traction company began that month, when he started work as motorman. He was appointed inspector in 1908 and in May, 1912, he was promoted to division superintendent in charge of the north end district, including Ballard and Queen Anne hill. On Nov. 1, 1912, Mr. Henderson was made superintendent of transportation, which position he has held continuously since that time. Greater responsibility attaches to the place of superintendent

of transportation than to any other position in the electric railway department. Upon the incumbent of this office will largely depend the success or failure of the municipal lines.

Col. Peter Junkersfeld, who received his discharge from the Army on March 4, resigned on March 31 as assistant to the vice-president of the Commonwealth Edison Company, Chicago, Ill., in charge of contract, operating, electrical and construction departments, to become engineering manager of Stone & Webster, Boston, Mass. Colonel Junkersfeld was graduated in 1895 from the School of Electrical Engineering of the University of Illinois, which in 1907 conferred upon him the post-graduate professional degree of electrical engineer. He has been connected with the Commonwealth Edison Company, Chicago, and its predecessors for more than twenty-three years. He served the company, at first as assistant to the mechanical engineer, in charge of the drafting department. From 1906 to 1909 he was electrical engineer and from 1909 to 1917 he was for a few years assistant to the second vice-presi-



PETER JUNKERSFELD

dent and then to the vice-president, who is in charge of operating, contract, construction and electrical departments. In addition to this Mr. Junkersfeld was for a number of years chairman of a monthly engineering construction and operating conference of various public utilities operating in several states. Mr. Junkersfeld was one of five reserve majors called into the service in June, 1917. He was assigned to the office of the Cantonment Division. A few months later this developed into the Construction Division of the Army, which handled construction work of almost every conceivable character in the United States, amounting to approximately \$800,000,000. Nine months after entering the service Mr. Junkersfeld attained the rank of colonel. During the time Mr. Junkersfeld was connected with the Commonwealth Edison Company, he organized and managed several manufacturing and other concerns. He has been active in association work in both the electric light and the railway fields and has contributed many

valuable papers and reports to the literature of the electrical industry.

James B. Dugan, Kenton, chief inspector of the State Public Utilities Commission of Ohio, will give up his official position on April 15 to become general manager of the Lima district of the Ohio Electric Company, with headquarters at Lima. Mr. Dugan has been in the inspection department of the commission since its creation more than a decade ago.

Philip F. Maguire, formerly assistant to the superintendent of maintenance of the Public Service Railway, Newark, N. J., has been appointed as superintendent of the Central Division of the company to succeed John J. Gettings, who died recently. Mr. Maguire has been holding the position of superintendent temporarily. Mr. Maguire entered the employ of the railway in 1896, as a conductor on the horse cars which were operated at that time in Plainfield. He served in that capacity for several years and was later transferred to Elizabeth, N. J.

F. A. Bailey has been appointed assistant general superintendent of the Consolidated Railway & Lighting Company, Charleston, S. C. Mr. Bailey was formerly superintendent of the Bergen and Southern Divisions of the Public Service Railway, Newark, N. J., for twelve years. He was educated at the Rushford, (N. Y.) High School and the Buffalo State Normal School and followed teaching for a time. He then laid the foundation of his future work by filling various positions in the operating department of the International Railway, Buffalo. In 1902-1905 Mr. Bailey gained experience in high-speed interurban railroading with the Columbus, Buckeye Lake & Newark Traction Company, Newark, Ohio, and the Columbus, London & Springfield Railway, Columbus, Ohio. In 1906 he was appointed superintendent of the Central Market Street Railway and the Columbus, Grove City & Southwestern Railway, Columbus, Ohio, leaving this position in May, 1907, to become connected with the Public Service Railway.

A. Jay Boardman, who soon after the outbreak of the war in 1917 resigned his position as division superintendent of the Terre Haute, Indianapolis & Eastern Traction Company, Terre Haute, Ind., to accept a commission as captain in the Ordnance Department, U. S. A., has just returned from France. At the time of the signing of the armistice, Captain Boardman was acting as artillery armament officer in charge of all artillery repairs of the Second United States Army at Toul, France. It was his fortune to be one of the few American army officers to be shown all the secret details of the famous 75-mm. and 155-mm. (6-in.) G. P. F. guns. Later he did considerable work on these and the other French artillery material with the fourth, first and third French armies and the First United States army at Chateau Thierry and during the St. Mihiel offensive. After a year's service overseas he received his discharge in March.



# Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER,

SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES

BUSINESS ANNOUNCEMENTS

## Car Window Glass Shows Decline

Prices Back to Those of Six Months Ago—Domestic Demand Light, Export Good

For sometime past manufacturers of window glass have not been holding closely to quoted discounts, although prices and discounts have not been changed openly. It is therefore possible to quote other discounts which more nearly represent current prices. Car window glass, single strength, first three brackets, both A and B quality is now 80 per cent against the former 77 per cent, while double strength, all sizes, A quality is 81 per cent compared to the former 79 per cent. These prices are the ones which were discontinued last September.

The demand for glass from the building trade has not been very satisfactory so far. There is much promise, however, of a greatly improved demand in the near future, and the restricted production should prevent any great decline in prices. The export demand is good and shows a constant increase.

## Stability of Rail Market Shaken

Refusal of Railroad Administration to Accept Prices Retards Work of Industrial Board

Following the disagreement last week of the Railroad Administration and the Industrial Board of the Department of Commerce over the price at which rails should be bought and sold, there has been an uneasy feeling in the steel market as to the immediate future of the rail market.

The Industrial Board was created by authority of the President to confer with producers of steel and other commodities and assist them in coming to some conclusion as to a fair price for their products. Regarding the steel industry, prices were considered too high to attract any considerable amount of buying. The rail market, the biggest outlet of any market for steel, was at a low ebb, and means were sought to stimulate activity in this important commodity.

If the Railroad Administration received a favorable price on rails it would undoubtedly buy. The question arises as to whether or not the Industrial Board received any intimation as to what price the Administration would consider favorable. If such intimation were received the action taken on it was such as to leave considerable discrepancy between it and the final price.

The industry sought a steel price which would stabilize the market. The government was to lead the way through its purchases, which should react upon the public to restore their confidence and assist in this stabilizing process. But co-ordination between government departments was lacking and the result is an unsettled market which some believe to be in worse condition than before, because of shaken confidence.

The prices of Bessemer T rails, open hearth T rails, high rails and girder rails were each reduced approximately \$10. The Railroad Administration has refused these prices and the electric as well as the steam roads feel the effects of this action.

## Steady Movement of Maintenance Equipment

Repairs to Old Apparatus and Replacements Continue—Equipment Bonds Provide Necessary Capital

Maintenance is providing a steady market for equipment and materials of all kinds; especially is there considerable activity in parts. Railway motors of an old vintage which would normally be scrapped for new are undergoing considerable repairs. The old equipment is not so easy on the coal pile as the new would be but the lack of ready money prohibits new purchases. The reborring and reabbtting of bearings and the replacement of field and armature coils find added activity. Obsolete brushholders must be again produced to permit motors twenty years old to continue their service.

The repair of old equipment is not to be deprecated except in that its efficiency may be much below that of present day equipment. But necessity is again doing the next best thing when capital is so lacking.

Many traction companies are financing their improvements through the flotation of equipment bonds. The most recent to come to notice is for a company in New Jersey where these bonds have been authorized to provide for shop equipment to keep the properties in good running condition. This company, however, enjoys an increased fare.

Trolley wire is being bought in small lots for repair and replacement work. Weatherproof wire has a similar call, and so has signal wire.

Galvanized stranded wire and telephone wire have both declined in price about 5 per cent within the last three weeks. One line of friction tape declined about 35 per cent and another about 15 per cent, bringing the price of these two brands together.

## Effects of Artificial Standard of Price

Abridging of Economic Laws by Industrial Board Leads Sooner or Later to Instability in Business

When the new and lower iron and steel prices were announced a few weeks ago, it seemed as though the signal had been given for industry to proceed. In fact, that was what was expected when the Industrial Board was asked to lend its aid to stabilize the market by establishing a fair price. Numerous manufactured products made largely of iron and steel were reduced in price almost immediately. On other products producers were figuring costs preliminary to lowering prices during the opening days of April. Orders to go ahead on a number of building projects were given, and industry generally became quickened.

Then the railroad administration and other government and buying departments came forward with the statement that they had never promised to be bound by the board's prices. In fact, the railroad administration does not purpose at the present time to pay the proposed price on rails.

As a result industry is again hesitant. The lower prices still prevail, but buyers are waiting to see if this fundamental raw-materials market is to be free and open or tied up by agreed prices to be maintained until 1920.

Each time there has been an attempt on the part of the government to abridge the laws of economics and establish false and arbitrary standards of price, business has found itself in a hesitant mood. During the war there may have been justification for such action to prevent profiteering.

Just now, however, when industry was beginning to find itself, when the retail trade was once more buying, when building was slowly opening up, when spring was starting the seasonal tide of business—in other words, after the worst is past—it is not so easy to understand why there should be this interference.

Such action might bring about confidence on the part of business in the immediate future, but what of the fall and winter months?

There are many who are calling for a free and open market in iron and steel. Such people believe in the fundamental laws of economics. They believe that industry will be strengthened if it cures its own ills. It does seem now that business generally will be on a better basis with less chance for future hesitation if such artificial standards are not utilized.



## Track Specialties Lower

No General Prices Given, However, Due to Varying Characteristics of Specialization

Prices of practically all track specialties such as cross-overs, switches, frogs, plates, etc., have recently decreased in price. No general amount of decline can be given, however, because each item is as a rule made according to special characteristics. Pages of data are required to arrive at a price for most pieces of this equipment on account of the varying characteristics required by the different railways. This takes account of the conditions of traffic, the kind of service to be rendered, spacings, curves and the varying amount of manganese that may be required to fulfill certain varying conditions.

No assurance has been given by one prominent manufacturer that there will be any further drop in track specialty prices due to the refusal of the Railroad Administration to accept the steel prices which they consider now too high. For the traction companies the question of finances is uppermost. In a recent interview between the representative of a track specialties producer and a New England electric railway official, the representative asked of what service he might be. The answer was to find a means of financing the construction work necessary for that property.

## Gear Manufacturers to Meet in Cleveland

President F. W. Sinram of the American Gear Manufacturers' Association announces that their annual convention will be held at the Hotel Statler, Cleveland, Ohio, April 14, 15 and 16. The organization includes in its membership representative companies engaged in making gears in the United States and Canada and promises to be of unusual interest to the manufacturing world. For some years past the American Gear Manufacturers' Association has been striving earnestly to affect an organization that would develop definite means for standardizing their products. The coming convention will center its attention on this problem.

Papers will be presented as follows: "Gear Steels," by Dr. Parker of the Carpenter Steel Company; "Proper Sizes and Materials for Gears"; "Worms and Worm Wheels," by a representative of the Timken-Detroit Axle Company.

Officers of the association are: President, F. W. Sinram, of the Van Dorn & Dutton Company, Cleveland, Ohio; vice-president, H. E. Eberhardt, of the Newark Gear Cutting Machine Company, Newark, N. J.; secretary, Frank D. Hamlin, of the Earle Gear & Machine Company, Philadelphia, Pa.; treasurer, Frank Horsburgh, of the Horsburgh and Scott Company, Cleveland, Ohio.

## Rolling Stock

Middlesex & Boston Street Railway, Boston, Mass., expects to introduce safety cars of the latest type early this month. It is reported the company has purchased six of these cars.

## Recent Incorporations

Miami Beach Electric Company, Miami, Fla.—Application has been made by the Miami Beach Electric Company for a charter to construct an electric line at Miami Beach. Capital stock, \$250,000. Incorporators: Carl G. Fisher, C. R. Cummins, J. H. McDuffin, Arthur G. Newby and George R. Kline.

## Franchises

Fort Worth, Tex.—A franchise has been granted by the County Commissioners' Court of Tarrant County to E. P. Turner and associates of Dallas to construct an electric interurban line from Fort Worth, Texas, to Mineral Wells. A franchise for the line in Palo Pinto county has also been granted by the County Commissioners of that county. The terms of the franchise set forth that the construction of the interurban line must begin within twelve months and the line completed within a reasonable length of time.

## Track and Roadway

Pacific Electric Railway, Los Angeles, Cal.—An extension will be built by the Pacific Electric Railway to its La Rambla car line through the Peck tract.

Daytona, Fla.—L. Armstrong and associates contemplate the construction of a belt line street railway to connect Daytona Beach and Seabreeze.

Berkshire Street Railway, Pittsfield, Mass.—Work will soon be begun by the Berkshire Street Railway on the reconstruction of its tracks on Southworth Street, Williamstown.

Detroit (Mich.) United Railway.—It is reported that the Detroit United Railway has under consideration the construction of a line from Flint to Davison and Potter's Lake and extensions to Elba, Lapeer and Imlay.

Granite City Railway, St. Cloud, Minn.—This company expects to reconstruct 1 mile of track with 60-lb. T-rail.

St. Croix Valley Electric Railway, St. Paul, Minn.—Plans have been submitted by Robert McKnight, engineer, to business men and bankers in St. Paul for the construction of an electric line from Prescott to St. Croix Falls.

Kansas City, Mo.—The city has awarded a contract to A. S. Hecker Company, Cleveland, Ohio, for the construction of the Twenty-third Street Viaduct. The cost of the construction will be shared by five railroads. The

contract price for building the viaduct and paving with wood block was \$731,000, or paving with brick or bitulithic, \$716,000.

Kansas City (Mo.) Railway.—An extension of the Independence cross-town line of the Kansas City Railways from the present northern terminus at Liberty and Moore Streets to Sugar Creek, about 2½ miles, is expected to be built this summer. P. J. Kealy, president of the Kansas City Railways, has accepted a proposition of the business men of Independence, headed by Mayor Christian Ott and A. J. Bundschu, to loan the company \$50,000 for ten years at 6 per cent interest, the money to be used in building the new line. The new line will be called the Independence & Sugar Creek Railway, but will be operated by the Kansas City Railways.

Interborough Rapid Transit Company, New York, N. Y.—The Public Service Commission for the First District of New York has received bids for the erection of the elevated portion of the Pelham Bay Park branch of the Lexington Avenue subway, extending from a point near the Bronx River east through Westchester Village to the southerly end of Pelham Bay Park. This line was begun in 1916, but war conditions and the failure of the original contractor to carry out his agreement has delayed the work and required the letting of a new contract. A part of the work is already done. The lowest bidder for the erection of the steel work was the firm of Terry & Tench, New York, whose offer was \$586,700.

Cumberland Railway & Power Company, Fayetteville, N. C.—The Cumberland Railway & Power Company has been organized by Herbert L. Jones of Richmond, Va., and associates, with a capital stock of \$200,000, to take over and complete the old street railway system at Fayetteville, owned by the municipality, extending it to Camp Bragg and also adding to it 3 miles of line within the city. The company has authorized an issue of \$500,000 of bonds, with the Bankers Trust Company of Norfolk as trustee. Construction work will be begun at once and it is expected the line will be placed in operation within six months.

Lake Shore Electric Railway, Cleveland, Ohio.—The rumored removal of the Lake Shore Electric Railway tracks from the Maumee Pike, between Fremont and Genoa, was revived when announcement was made that the company contemplates purchasing right-of-way paralleling the New York Central Railway. It would give a shorter route to Toledo. If the new road is constructed, Hessville, Gibsonburg and Woodville would be shut off from connection by Interurban with Fremont, while the new road would give connections with Lindsey and Elmore.

Philadelphia, Pa.—Bids were recently received by the Department of City Transit for the construction of 68 column foundations of concrete in Front Street from above Arch Street to Cal-lowhill Street, for the Frankford ele-



vated line. The lowest bidder was the Brown-King Construction Company, Philadelphia, Pa., at \$32,058. Sealed proposals will be received by William S. Twining, director of the Department of City Transit, until April 22 for furnishing and erecting the steel superstructure for a continuation of the Frankford Elevated Railway in Front Street, from near Arch Street to Cal-lowhill Street.

### Power Houses, Shops and Buildings

**Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ind.**—Arrangements are being made by the Terre Haute, Indianapolis & Eastern Traction Company for improving the electric lighting service in Brazil and vicinity. The company will erect a transmission line from the Water Street Station in Terre Haute to a point where the Clinton and Brazil high-tension lines diverge. It is also proposed to extend the high-tension line south of Terre Haute into the coal fields of Sullivan County and back through Clay City to Brazil.

**Elmira Water, Light & Railroad Company, Elmira, N. Y.**—Plans are being contemplated by the Elmira Water, Light & Railroad Company for the enlargement of its power plant on East Water Street.

**Richmond Light & Railroad Company, New York, N. Y.**—The Richmond Light & Railroad Company has recently completed the construction of a new 6600-volt transmission line from its power plant at Livingston to Tottenville, and arrangements are now under way for the installation of transformers and auxiliary equipment. At the present time the company is installing a new booster station in the Arthur Kill Road.

**Northern Ohio Traction & Light Company, Akron, Ohio.**—The construction of a new substation is contemplated by the Northern Ohio Traction & Light Company, to cost about \$15,000.

**Lake Shore Electric Railway, Cleveland, Ohio.**—The electric plant and substation of the Lake Shore Electric Railway at Berlin Heights was recently destroyed by fire, causing a loss of about \$15,000.

**Jackson Railway & Light Company, Jackson, Tenn.**—A report from the Jackson Railway & Light Company states that the company has placed contracts for the construction of a new carhouse and repair shop.

**Puget Sound Traction, Light & Power Company, Seattle, Wash.**—Plans are being made by the Puget Sound Traction, Light & Power Company for the construction of a large warehouse in which will be stored machinery and equipment owned by the company and not included in the purchase contract with the city of Seattle when the car lines are taken over. The structure will be 220 x 56 ft., costing about \$15,000.

### Trade Notes

**Aspromet Company, Pittsburgh, Pa.**, has changed its name to the H. H. Robertson Company.

**H. G. Lewis**, sales manager of the Electric Service Supplies Company, Philadelphia, has been elected vice-president of that company. He will continue his work as vice-president and sales manager.

**Charles F. Ames & Company, New York City**, have been appointed to act as the New York sales department of the Platt Iron Works of Dayton, Ohio, manufacturers of pumping and power plant equipment.

**The Terry Steam Turbine Company, Hartford, Conn.**, announces that its reduction gears are again on the market. They were not obtainable during the last year owing to the concentration of the company almost entirely on turbines for destroyers.

**Okonite Company** on April 1 moved its entire executive staff from 501 Fifth Avenue, New York City to the company's plant at Passaic, N. J., where the company's main office will hereafter be located. A sales office will be retained at 501 Fifth Avenue, New York.

**B. A. Wagner**, manager of the Electric Agencies Company, Inc., has secured the Pacific Coast agencies for the Collyer Insulated Wire Company, manufacturer of rubber-covered and weatherproof wire, and the Tubular Woven Fabric Company, manufacturer of "Duraduct."

**George K. Heyer** is the new assistant telephone sales manager of the Western Electric Company, having been advanced from the position of railway sales engineer. He has been with the company in New York since 1902 and will remain there with headquarters at 195 Broadway.

**A. P. Green Fire Brick Company of Mexico, Mo.**, has opened an Eastern district sales office in New York City at 30 Church Street. **Howard C. Thayer**, formerly field mechanical engineer for the J. G. White Engineering Corporation at United States Nitrate Plant No. 2, is in charge.

**Lieut.-Com. H. J. Elson**, United States Naval Reserve, has been released to inactive status and has resumed his civilian work as secretary and treasurer of the Walter A. Zelnicker Supply Company, St. Louis, where he is in charge of internal management and manufacturing operations.

**A. L. Humphrey** has been elected president of the Westinghouse Air Brake Company to succeed John F. Miller, who has resigned some of his active duties. Under Mr. Humphrey's management the business of the company has increased more rapidly and its interests have expanded and developed more than ever before. Mr. Humphrey's greatest triumph as a manufacturer came through the war when he succeeded, in the completion of contracts for war material for this country

and the Allies, in establishing enviable records. The following board of directors was elected: B. V. Becker, James D. Callery, E. M. Herr, A. L. Humphrey, John F. Miller, John R. McCune, John R. McGinley, Charles McKnight, M. S. Rosenwald, W. D. Uptegraff and H. H. Westinghouse.

### New Advertising Literature

**Penn Electrical & Manufacturing Company, Irwin, Pa.**: Bulletin No. S-10 on safety panels and cabinets.

**Bates Expanded Steel Truss Company, Chicago, Ill.**: A mailing folder about its steel poles for various services.

**Locomotive Superheater Company, New York City**: Bulletin No. T-1, on superheaters for stationary power plants.

**Ballman-Whitten Manufacturing Company, St. Louis, Mo.**: Folder showing and describing flush and surface type direct-current ammeters.

**A. F. Daum, Pittsburgh, Pa.**: A folder about the refillable cartridge fuses as well as a leaflet about the Daum refillable fuse plug.

**Barrett Company, New York City**: Booklet entitled "Long Life for Wood at Low Cost," which tells when, where and how to use "Carbosota" creosote oil.

**General Electric Company, Schenectady, N. Y.**: An index dated April 1, 1919, to its descriptive bulletins and sheets and one to its supply-part bulletins.

**Babcock & Wilcox Company, New York City**: "Principles of Combustion in the Steam-Boiler Furnace," outlines the principles involved in the study of what happens in the combustion chamber of furnaces.

**Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa.**: catalog, made up of 1264 pages of description pertaining to all electrical products of the company. There is a cross index, index to style numbers, and table of "Approximate Cost Multipliers," which enables one to figure the approximate cost of all supplies listed. There is also a vast amount of information of a technical and engineering nature. It is planned to issue this catalog annually.

**American Steam Conveyor Corporation, 110 West Fortieth Street, New York City, and 326 West Madison Street, Chicago**: A 160-page book entitled "Modern Methods of Ash Disposal." This is a presentation of methods of moving ashes, soot and combustion waste from boiler room to disposal station. Advantages and drawbacks of the different systems are very completely discussed in the front portion of the book, while the rest of it is devoted to photographs and information about various "American" fittings and installations of these devices. Interesting data on the coals of the United States and other tables are included in this publication.



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## Calgary Has Hills, Curves and—Peacocks

Calgary's double-truck cars have air brakes and Peacocks. Calgary's single-truck cars have Peacocks exclusively.

And Calgary is a city of more than 65,000—the first of its size to prove that *one-man* cars, properly equipped with *good brakes* and other good equipment, can properly and profitably serve the people.

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talk with  
employers of labor

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All the world is talking of "labor problems," of "labor adjustment," of "labor management," of "labor unrest."

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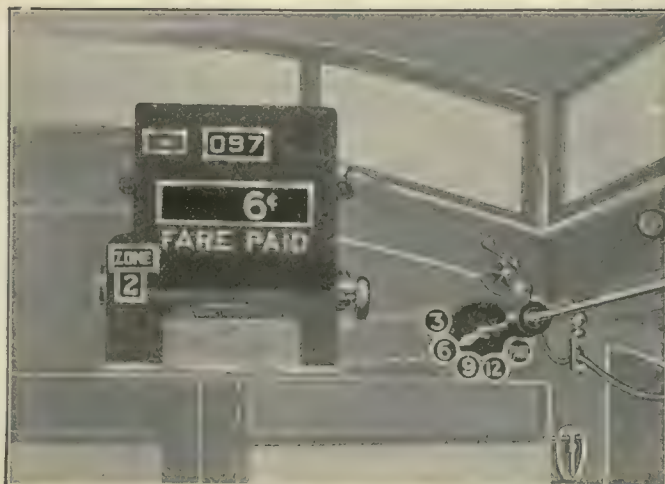
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# Ohmer Fare Registers FOR ZONE FARES



One Type of Ohmer Zone Fare Register

**W**E believe it is a good and fair business proposition to charge the passengers in proportion to the distance traveled. We believe the zone system now under consideration by many companies will solve satisfactorily one of the most important problems now before the industry. The zone plan, however, cannot bring results unless the fares are accurately accounted for. To that end

we have adapted certain types of Ohmer Fare Registers to meet the new conditions. The illustration shows the first Ohmer Fare Register adopted for zone collections. The zone indicator clearly shows the zone through which the car is passing. The printed report from the register gives a complete record of all fares registered in each zone. The successive zone indications advance automatically, and the record is intamperable. This particular type of register is adapted to a four-zone line. Machines of much larger capacity with a zone check issuing device which will meet all conditions on the largest and most complicated lines, can also be supplied.

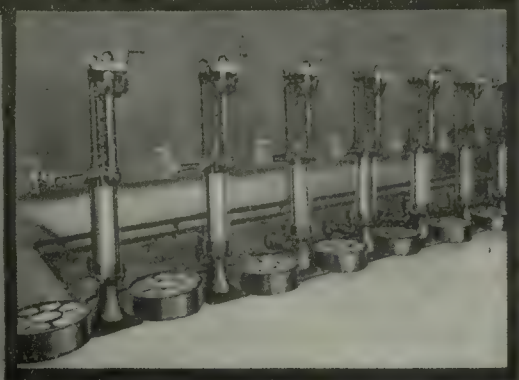
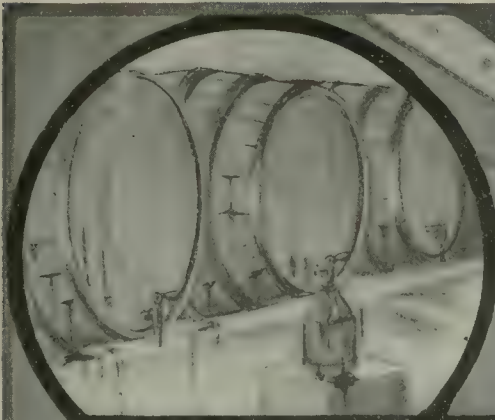
*We will gladly furnish further information on request.*

ZONE	TRIP	DIRECTION	LINE NO	3¢	6¢	9¢	12¢	PASS	REGISTER NUMBER	TOTAL PASSENGERS	DATE	IDENTIFICATION
1	★	1	18	114	060	032	018	034	100	6924	DEC 5 14	
1	2	0	18	106	041	024	006	031	100	6874	DEC 5 14	
2	2	0	18	090	035	009	006	022	100	6828	DEC 5 14	
3	2	0	39	082	027	009	006	014	100	6804	DEC 5 14	
4	2	C	39	075	027	009	006	010	100	6793	DEC 5 14	
4	1	1	39	066	020	004	000	007	100	6763	DEC 5 14	
3	1	1	39	056	015	000	000	006	100	6743	DEC 5 14	
2	1	1	39	026	000	000	000	004	100	6696	DEC 5 14	
1	1	1	39	000	000	000	000	000	100	6666	DEC 5 14	

Printed Record from one Type of Ohmer Zone Fare Register

**Ohmer  
Fare  
Register  
Company  
Dayton, Ohio**





## Waste Inefficiency Fire Risk

Versus

## Economy Efficiency Safety

These two factions are on trial in your car house to-day if you still maintain the antiquated oil barrel. There can only be one verdict—in favor of

### GILBERT & BARKER OIL HANDLING OUTFITS

Their economy consists in the saving of oil, because the containers are leak proof, dust proof and dirt proof. There is no evaporation. The efficient pumps as shown in the square insert were installed in the Main Oil Room of a large Street Railway Co. The tanks are located in the basement. The saving of oil by means of these pumps has been so marked that the installation paid for itself very quickly.

The Superintendent or Railway Executive intent on saving money for his company will do a good day's work by investigating these up-to-the-minute G. & B. Oil Handling Outfits. Write today for Bulletin 60.

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"CAR"

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ST. LOUIS, MO. April 12'19

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Our business relations in the past have been so pleasant, that we desire at this time to acquaint you with the conditions which may have resulted in unusual delays and disappointments in the execution of your orders during the war period.

The requirements of our Government naturally received our first consideration, in order that we might contribute to the utmost towards the glorious victory which has been attained. To this end we have devoted practically our entire production, and in some of our departments the percentage given to the Government was 100%. This unusual demand having ceased with the termination of hostilities, we are happy to advise that any orders now on hand will be executed with the least possible delay, and that in the future we hope to be in position to give you even better service than during the pre-war period, as the demands of the emergency necessitated our improving and enlarging our manufacturing facilities, thereby increasing our efficiency.

For any inconvenience which you might have suffered at our hands, we ask your indulgence, feeling confident that you would not have wished us to have taken any course other than the patriotic one we pursued.

Highly appreciating your past courtesies and consideration, we beg to remain,

Yours very truly,

EBM/D

ST. LOUIS CAR COMPANY,

*Edwin B. Meissner*  
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ANY man who thinks at all knows that the fundamental interests of labor and capital are identical. ¶ The most stable business is that in which these two factors work together in the greatest spirit of unity, confidence and mutual respect. In such a business there is at once achieved, first, the greatest volume of production; second, the lowest cost per unit of finished product; third, the highest wage to labor; fourth, the greatest profit to capital. ¶ During the war the sale of Liberty Bonds to employes in all kinds of business concerns, and particularly the methods used in making such sales, proved the most effective means in commercial history of bringing employer and employe together. ¶ The average employer and employe learned more than ever before that the basic qualities of human nature are common to both the boss and the workman—that both have a love of justice, liberty and democracy; that both have a mutual interest in the safety and prosperity of our country; and that both are willing to make sacrifices to insure its safety and well being. ¶ The work the employer did in educating his men regarding Government securities and their purchase was not an expense—it was an opportunity to promote harmony and goodwill. It brought a definite business return. Employers found that patriotic and thrifty workmen are better producers. ¶ Are the business men of America willing to let this opportunity slip away now? ¶ If they are awake to the chance before them, they will do even more to bring to their fellow workers and partners in business the values that accompany a subscription to the Victory Loan than they did to “sell” that same idea in connection with former Liberty Loans. Get to your employes the idea of the value of patriotism in peace as in war. ¶ You will be doing a good job for yourself, for your men, and for your country.

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—good bonding  
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*Write for particulars.*

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### Where Reliability Counts

Did you ever realize how much depends on the tools you use? If they are poor tools production will be decreased and consequently there will be delay along the line.

### Carnegie Electric Tool Steel

may serve your purpose. It is made in five grades. These grades are based on the carbon content.

Their uses are as follows:

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Enlarged to 1½ times actual size

Nickel-Silver  
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Designs developed according to your ideas and subject to your approval. We make the metal, the dies and the tokens.

We have the experience, the equipment, the capacity for rapid quantity production.

*Information on request.*

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*In War or  
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## Cut Out the Waste!

Clean up! Do it NOW! Do it regularly!

Every piece of Idle Equipment, Unnecessary Material or Scrap represents WASTE!

—*waste*

**Money!**  
**Time!**  
**Space!**  
**Labor!**  
**Material!**

—the *money* such equipment or material cost earns nothing and is not available for other use.

—the *time* it is idle is wasted when it can render service elsewhere.

—the *space* it occupies costs money and may be needed for other purposes.

—the *labor* of its manufacture is wasted and also the labor of producing a duplicate for the man who *can* use it.

—the *material* it represents would be useful in another form.

Cut out *all* this waste! Don't have material or equipment around that is not needed. Turn it into cash.

There is always a market for either scrap or good used machinery. Conservation of both materials and machinery can be practiced with just as much profit in peace as in war times.

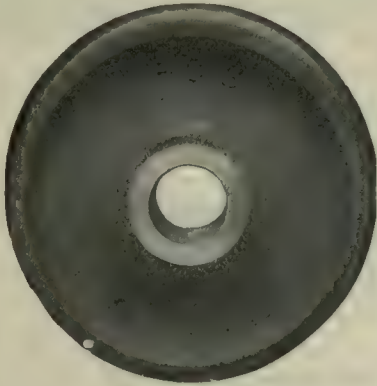
Buyers for surplus material, good used machinery, junk or scrap, can easily be found through the

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is an improved  
**Chilled  
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Their constant use on a large number of street and interurban railways throughout the country demonstrates their superior qualities.

The chilled tread surface contains three and one-half per cent. carbon white iron — is harder than tool steel and capable of long wear.

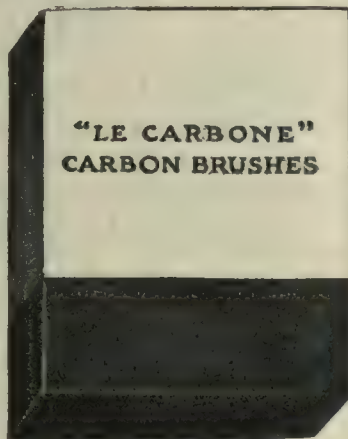
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CABLES  
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**AMERICAN ELECTRICAL WORKS**

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## Peirce Forged Steel Pins with Sheet Steel Thimbles

Your best insurance against insulator breakage

**Hubbard & Company**

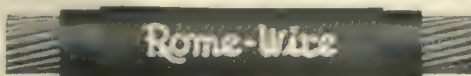
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## EUREKA PRODUCTS

Commutators, Trolley Wheels, Sleet Trolley Wheels, Trolley  
Ears, Line Material, Controller Fingers, Brush Holders, etc.

We make quality goods.

THE EUREKA COMPANY, North East, Pa.



Bare and Tinned Copper Wire  
Magnet Wire, Rubber Covered Wire  
**Rome Wire Co., Rome, N. Y.**

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TUBULAR STEEL POLES

Ask for "NATIONAL" Bulletin No. 14, "NATIONAL" Tubular Steel Poles  
**NATIONAL TUBE COMPANY, PITTSBURGH, PA.**



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Manufacturers of

# ALUMINUM

## Electrical Conductors

All-Aluminum and Steel Reinforced

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Signal Circuits  
Railway Catenary Construction  
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Ingots—Rods—Rivets—Extruded Shapes  
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also

Aluminum Solders and Flux  
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GENERAL SALES OFFICE

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Latin America: Aluminum Co. of South America, Pittsburgh, Pa.

England: Northern Aluminium Co., Ltd., London.

## Steel Poles For Every Pole Purpose

Cut shows Bates Steel Poles in Electric Trolley Line Service by Des Moines City Ry. Co., Des Moines, Iowa. Over 2100 Bates Poles in use in Des Moines, mostly Trolley Service and some Street and Park Lighting.

Bates Steel Poles are becoming universally popular.

Repeat orders testify their general suitability for every Pole purpose, Telegraph, Telephone, Power Transmission, Electric Trolley Lines, Electric Lighting, etc. Highest class and most up-to-date steel pole equipment in the world. Our STEEL POLE TREATISE tells the story. Ask for it. About 2000 tons of steel constantly on hand; immediate shipments and lowest prices.

Tubular Steel Poles cost 50 per cent. more than Bates Steel Poles, yet Bates Poles are 100 per cent. stronger — will last 100 per cent. longer, cover a much broader range of adaptability and are much more artistic than Tubular Poles; ask us to verify these facts.

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Expanded Steel  
Truss Co.

208 S. La Salle St.  
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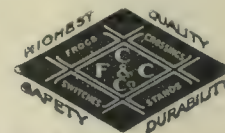
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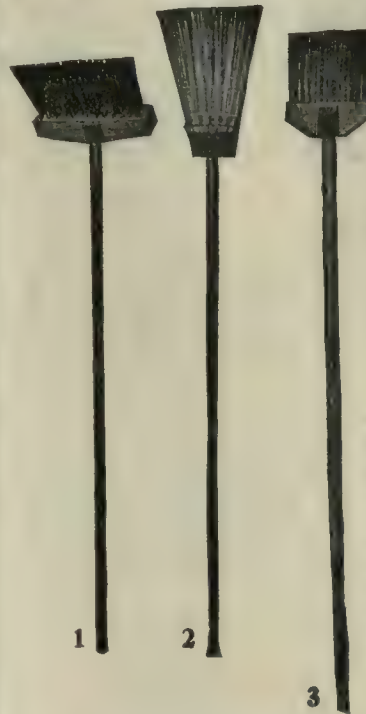


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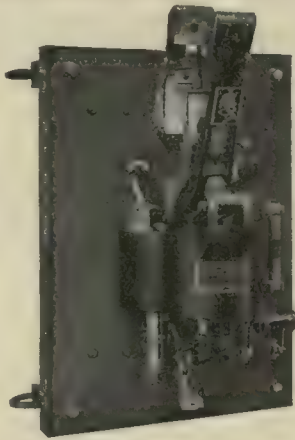
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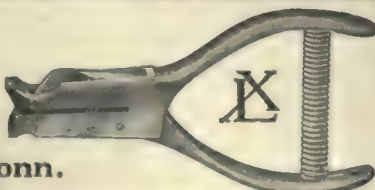
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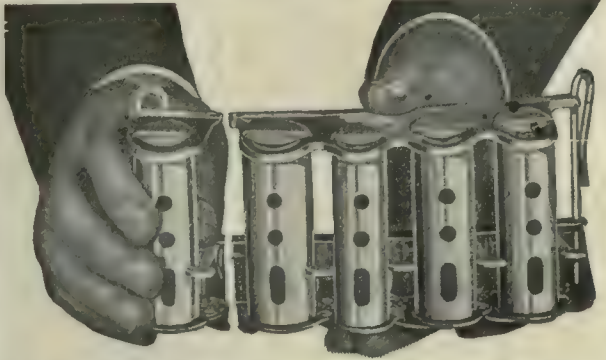
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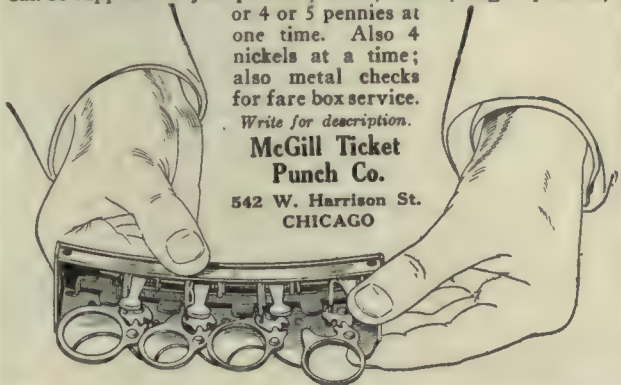
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GRESS OF AUGUST 24, 1912

Of Electric Railway Journal, published weekly at New York, N. Y., for Apr. 1, 1919.  
State of New York } ss.  
County of New York }

Before me, a notary public in and for the State and county aforesaid, personally appeared Edward Caldwell, who, having been duly sworn according to law, deposes and says that he is the Treasurer of the McGraw-Hill Co., Inc., publishers of Electric Railway Journal, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 443, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business manager are: Publisher, McGraw-Hill Co., Inc., 10th Ave. at 36th St., New York, N. Y. Editor, Henry W. Blake, 10th Ave. at 36th St., New York, N. Y. Managing Editor, none. Business Manager, L. W. Seeligberg, 10th Ave. at 36th St., New York, N. Y.

2. That the owners are: (Give names and addresses of individual owners, or, if a corporation, give its name and the names and addresses of stockholders owning or holding 1 per cent. or more of the total amount of stock). McGraw-Hill Co., Inc., 10th Ave. at 36th St., New York, N. Y. James H. McGraw, 10th Ave. at 36th St., New York, N. Y. Arthur J. Baldwin, 10th Ave. at 36th St., New York, N. Y. John McGhie, 10th Ave. at 36th St., New York, N. Y. Fred Low, 10th Ave. at 36th St., New York, N. Y. Henry W. Blake, 10th Ave. at 36th St., New York, N. Y. Leonard D. Baldwin, 27 Pine St., New York, N. Y. Martin W. Foss, 239 W. 39th St., New York, N. Y. Edward Caldwell, 10th Ave. at 36th St., New York, N. Y. F. S. Weatherby, 163 Clinton Road, Brookline, Mass. Arthur J. Baldwin, 10th Ave. at 36th St., New York, N. Y. Trustee for Estate of John A. Hill, Morgan Baldwin, Donald Baldwin, Grace Baldwin, Franklin Baldwin, and Cynthia Baldwin.

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4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

5. That the average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the six months preceding the date shown above is (This information is required from daily publications only.)

EDW. CALDWELL, Treas.  
Sworn to and subscribed before me this 18th day of March, 1919.

[Seal] MARTIN J. WIEMER  
Notary Public, Kings County Certificate No. 103. Certificate filed in New York County No. 316.

My commission expires March 30 1920.





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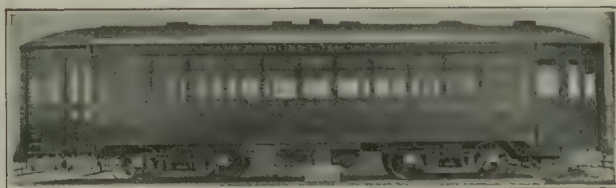
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Equipment, Apparatus and Supplies Used by the Electric Railway Industry with  
Names of Manufacturers and Distributors Advertising in this Issue

Acetylene Service & Apparatus  
Oxweld Acetylene Co.  
Advertising, Street Car  
Collier, Inc., Barron G.

Air Rectifiers  
Holden & White, Inc.

Anchor, Guy  
Electric Service Supplies Co.  
Holden & White, Inc.  
Ohio Brass Co.  
Westinghouse Elec. & M. Co.

Ash Storage Tanks, Cast Iron  
Green Engineering Company

Automobiles and Buses  
Brill Co., The J. G.  
White Co., The

Axle Straighteners  
Columbia M. W. & M. I. Co.

Axles, Car Wheel  
Bemis Car Truck Co.  
Brill Co., The J. G.  
Carnegie Steel Co.  
National Railway Appliance Co.  
St. Louis Car Co.  
Standard Steel Works Co.  
Westinghouse Elec. & M. Co.

Babbling Devices  
Columbia M. W. & M. I. Co.

Badges and Buttons  
Electric Service Supplies Co.  
International Register Co., The

Batteries, Dry  
Nichols-Lintern Co.

Batteries, Storage  
Electric Storage Battery Co.

Bearings and Bearing Metals  
Bemis Car Truck Co.  
Columbia M. W. & M. I. Co.  
Eureka Co.  
General Electric Co.  
More-Jones Brass & Metal Co.  
St. Louis Car Co.  
Westinghouse Elec. & M. Co.

Bearings, Center and Roller Slide  
Holden & White, Inc.

Bells and Gongs  
Brill Co., The J. G.  
Columbia M. W. & M. I. Co.  
Electric Service Supplies Co.  
St. Louis Car Co.

Benders, Rail  
Niles-Bement-Pond Co.  
Zelnicker, Walter A., Supply Co., Inc.

Rollers  
Babcock & Wilcox Co.

Roller Tubes  
National Tube Co.

Road Testers  
American Steel & Wire Co.  
Lincoln Bonding Co.

Bonding Apparatus  
American Steel & Wire Co.  
Electric Railway Improvement Co.  
Electric Service Supplies Co.  
Lincoln Bonding Co.  
Ohio Brass Co.  
Oxweld Acetylene Co.

Bonds, Rail  
American Steel & Wire Co.  
Electric Railway Improvement Co.  
Electric Service Supplies Co.  
General Electric Co.  
Lincoln Bonding Co.  
Ohio Brass Co.  
Westinghouse Elec. & M. Co.

Book Publishers  
McGraw-Hill Book Co., Inc.

Boring Tools, Car Wheel  
Niles-Bement-Pond Co.

Controller Regulators  
Electric Service Supplies Co.

Brackets and Cross Arms (See also  
Poles, Ties, Posts, Etc.)  
Bates Expanded Steel Truss Co.  
Hubbard & Co.  
Linsley Bros. Co.  
Ohio Brass Co.

Brake Adjusters  
Holden & White, Inc.  
Westinghouse Traction Brake Co.

Brake Shoes  
Amer. Brake Shoe & Fdry. Co.  
Barbour-Stockwell Co.  
Brill Co., The J. G.  
Columbia M. W. & M. I. Co.  
St. Louis Car Co.

Brakes, Brake Systems and Brake  
Parts  
Bemis Car Truck Co.  
Brill Co., The J. G.  
Columbia M. W. & M. I. Co.  
General Electric Co.  
Holden & White, Inc.  
National Brake Co.  
St. Louis Car Co.  
Safety Car Devices Co.  
Westinghouse Trac. B. Co.

Brick, Fire  
Green Engineering Co.

Brooms, Track, Steel or Rattan  
Faxon Co., J. W.  
Zelnicker, Walter A., Supply Co., Inc.

Brushes, Carbon  
General Electric Co.  
Jeandron, W. J.  
Morgan Crucible Co.  
United States Graphite Co.  
Westinghouse Elec. & M. Co.

Brushes, Graphite  
United States Graphite Co.

Brush Holders  
Anderson Mfg. Co., A. & J. M.  
Columbia M. W. & M. I. Co.  
Eureka Co.

Buckets  
Blaw-Knox Company

Bushings, Case Hardened & Man-  
ganese  
Bemis Car Truck Co.

Cables. (See Wires and Cables.)

Carbon Brushes. (See Brushes,  
Carbon.)

Car Equipment. (For Fenders,  
Heaters, Registers, Wheels,  
etc.—See those headings.)

Car Trimmings. (For Curtains,  
Registers, Doors, Seats, etc.—  
See those headings.)

Car Panel Safety Switches  
Westinghouse Elec. & Mfg. Co.

Cars, Passenger, Freight, Express,  
etc.  
American Car Co.  
Brill Co., The J. G.  
Kuhlman Car Co., G. C.  
McGuire-Cummings Mfg. Co.  
St. Louis Car Co.  
Wason Mfg. Co.

Cars, Second Hand  
Electric Equipment Co.

Cars, Self-Propelled  
Electric Storage Battery Co.  
General Electric Co.

Castings, Brass, Composition or  
Copper  
Anderson Mfg. Co., A. & J. M.  
Columbia M. W. & M. I. Co.  
Eureka Co.  
More-Jones Brass & Metal Co.

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American Steel Foundries.  
Bemis Car Truck Co.  
Columbia M. W. & M. I. Co.  
St. Louis Car Co.  
Standard Steel Works Co.

Castings, Malleable and Brass  
Amer. Brake Shoe & Fdry. Co.  
Bemis Car Truck Co.  
Columbia M. W. & M. I. Co.  
St. Louis Car Co.

Catchers and Retrievers, Trolley  
Electric Service Supplies Co.  
Holden & White, Inc.  
Kerschner Co., Inc., W. R.  
Ohio Brass Co.  
Wood Co., Chas. N.

Change Carriers  
McGill Ticket Punch Co.

Ceiling, Car  
Pantasote Co.

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Automatic Reclosing Circuit  
Breaker Co.  
The Cutter Electrical & Mfg. Co.  
General Electric Co.  
Westinghouse Elec. & Mfg. Co.

Clamps and Connectors for Wires  
and Cables  
Anderson Mfg. Co., A. & J. M.  
Electric Service Supplies Co.  
Eureka Co.  
General Electric Co.  
Hubbard & Co.  
Ohio Brass Co.  
Westinghouse Elec. & Mfg. Co.

Cleaners and Scrapers Track—(See  
also Snow-Plows, Sweepers and  
Brooms.)  
Brill Co., The J. G.  
Ohio Brass Co.

Clusters and Sockets  
General Electric Co.

Coal and Ash Handling—(See Con-  
veying and Hoisting Machin-  
ery.)

Coil Banding and Winding Ma-  
chines  
Columbia M. W. & M. I. Co.  
Electric Service Supplies Co.

Coils, Armature and Field  
Cleveland Armature Works.  
Columbia M. W. & M. I. Co.  
D & W Fuse Co.  
General Electric Co.  
Independent Lamp & Wire Co.  
Rome Wire Co.  
Westinghouse Elec. & M. Co.

Coils, Choke and Kicking  
Electric Service Supplies Co.  
General Electric Co.  
Westinghouse Elec. & M. Co.

Coin-Counting Machines  
International Register Co., The

Commutator Slotters  
Electric Service Supplies Co.  
General Electric Co.  
Westinghouse Elec. & Mfg. Co.  
Wood Co., Chas. N.

Commutator Truing Devices  
General Electric Co.

Commutators or Parts  
Cameron Electrical Mfg. Co.  
Cleveland Armature Works.  
Columbia M. W. & M. I. Co.  
Eureka Co.  
General Electric Co.  
Westinghouse Elec. & Mfg. Co.

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General Electric Co.  
Westinghouse Trac. B. Co.

Concrete Mixers  
Blaw-Knox Co.

Condensers  
General Electric Co.  
Westinghouse Elec. & Mfg. Co.

Connectors, Solderless  
Westinghouse Elec. & Mfg. Co.

Controller Fingers  
Eureka Co.  
Trigger Lock Reversible Controller  
Finger

Controllers or Parts  
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Eureka Co.  
General Electric Co.  
Westinghouse Elec. & Mfg. Co.

Controlling Systems  
General Electric Co.  
Westinghouse Elec. & Mfg. Co.

Converters, Rotary  
General Electric Co.  
Westinghouse Elec. & Mfg. Co.

Conveying and Hoisting Machinery  
Columbia M. W. & M. I. Co.  
Green Engrg. Co.

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Brill Co., The J. G.  
Electric Service Supplies Co.  
International Register Co., The  
Samson Cordage Works.

Cord Connectors and Couplers  
Electric Service Supplies Co.  
Samson Cordage Works.  
Wood Co., Chas. N.

Couplers, Car  
Brill Co., The J. G.  
Ohio Brass Co.  
Van Dorn Coupler Co.  
Westinghouse Trac. B. Co.

Cranes  
Toledo Bridge & Crane Co., The

Crossotting. (See Wood Preserva-  
tives)

Cross Arms. (See Brackets)

Crossing Foundations  
International Steel Tie Co.

Crossing Signals. (See Signals,  
Crossing)

Crossings, Track. (See Track,  
Special Work)

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Armco Iron Culvert & Flume  
Mfrs. Assn.  
Canton Culvert & Silo Co.

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Brill Co., The J. G.  
Electric Service Supplies Co.  
Pantasote Co.  
St. Louis Car Co.

Cutting Apparatus, Oxy-Acetylene  
Oxweld Acetylene Co.

Dealers' Machinery  
Archer & Baldwin  
Cleveland Armature Wks.  
Electric Equipment Co.  
Foster Co., L. B.  
Griawold Machine Co., Geo. M.  
Hyman Michaels Co.  
MacGovern & Co., Inc.  
Zelnicker Supply Co., Inc.,  
Walter A.

Derailing Devices. (See also Track  
Work)  
Cleveland Frog & Crossing Co.

Destination Signs  
Columbia M. W. & M. I. Co.  
Electric Service Supplies Co.

Detective Service  
Wish Service, Inc., P. Edward.

Dogs, Lathe  
Williams & Co., J. H.

Door Operating Devices  
Consolidated Car Heating Co.  
National Pneumatic Co., Inc.  
Safety Car Devices Co.

Doors and Door Fixtures  
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General Electric Co.  
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Doors, Folding Vestibule  
National Pneumatic Co., Inc.

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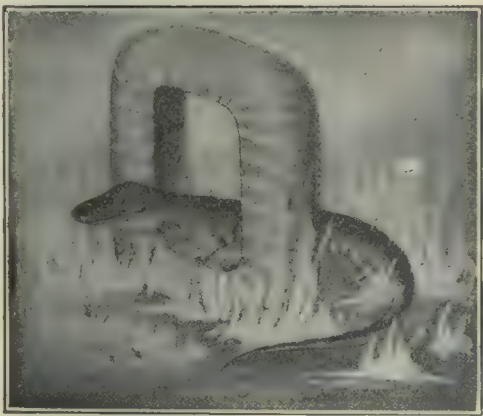
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Richey, Albert S.  
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Scofield Engineering Co.  
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White Companies, The J. G.  
Woodmansee & Davidson Engineering Co.

**Engines, Gas and Oil**

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Ohmer Fare Register Co.

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Electric Service Supplies Co.  
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D & W Fuse Co.  
General Electric Co.  
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**Fuses, Refillable**

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General Electric Co.

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Westinghouse Traction Brake Co.

**Gas Producers**

Westinghouse Elec. & Mfg. Co.

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**Gages, Oil and Water**

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**Gear Blanks**

Carnegie Steel Co.  
Standard Steel Works Co.

**Gear Cases**

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Electric Service Supplies Co.  
Westinghouse Elec. & Mfg. Co.

**Gears and Pinions**

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Kerschner Co., Inc., W. R.  
National Railway Appliance Co.  
Nuttall Co., R. D.

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Railway Track-work Co.

**Grinding Blocks and Wheels**

Railway Track-work Co.

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Ohio Brass Co.

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Anderson M. Co., A. & J. M.  
Electric Service Supplies Co.  
More-Jones B. & M. Co.  
Nuttall Co., R. D.  
Star Brass Works.

**Headlights**

Electric Service Supplies Co.  
General Electric Co.  
Ohio Brass Co.  
St. Louis Car Co.

**Headlinings**

Pantasote Co.

**Heaters, Car (Electric)**

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Gold Car Heating & Lighting Co.  
Holden & White, Inc.  
Smith Heater Co., Peter.

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Cooper Heater Co.  
Holden & White, Inc.  
Smith Heater Co., Peter.

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Electric Service Supplies Co.  
Holden & White, Inc.  
Smith Heater Co., Peter.

**Hoists and Lifts**

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Ford Chain Block & Mfg. Co.  
Niles-Bement-Pond Co.  
Toledo Bridge & Crane Co., The

**Hose, Bridges**

Ohio Brass Co.

**Hose, Pneumatic and Fire**

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Niles-Bement-Pond Co.

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General Electric Co.  
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Weston Elec'l Instrument Co.

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Standard Woven Fabric Co.  
Westinghouse Elec. & Mfg. Co.

**Insulation. (See also Paints)**

Anderson M. Co., A. & J. M.  
Drew Electric & Mfg. Co.  
Electric Service Supplies Co.  
General Electric Co.  
Holden & White, Inc.  
Mitchell-Rand Mfg. Co.  
Westinghouse Elec. & Mfg. Co.

**Insulators. (See also Line Material)**

Anderson M. Co., A. & J. M.

**Electric Service Supplies Co.**

General Electric Co.  
Ohio Brass Co.  
Westinghouse Elec. & Mfg. Co.

**Insulator Pins**

Electric Service Supplies Co.  
Hubbard & Co.

**Insurance, Fire**

Marsh & McLennan

**Jacks. (See also Cranes, Hoists and Lifts)**

Brill Co., The J. G.  
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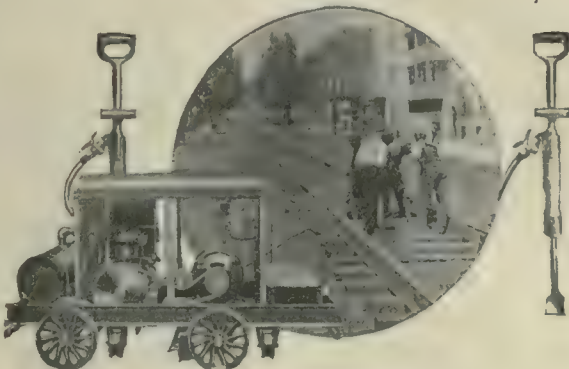
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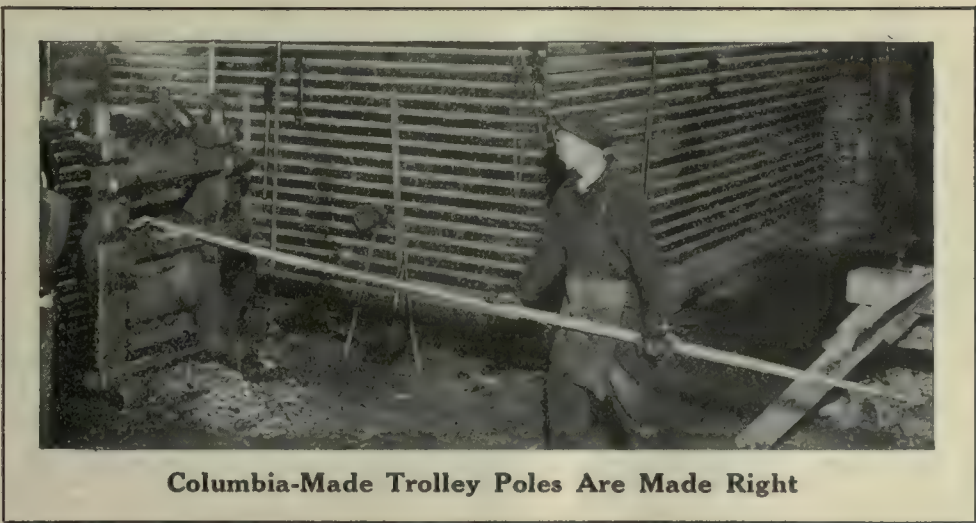
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### UNIVERSAL ANTI-SLIP TREADS

cars and station steps.

**Universal Safety Tread Company**  
Waltham, Mass.

### VAN DORN COUPLERS

are made for every condition and requirement. M.C.  
B. Pin and Link, Car and Air, in all sizes and types.

**VAN DORN COUPLER CO.**

2325 So. Paulina St., Chicago, Ill.

### Eight Hundred and Twenty-three Equipments of N L Indicating Tail-lights Sold During the Year 1918

2323 Cars now equipped and the motormen in Cleveland, Toledo, Philadelphia, Akron and St. Joseph say it is the best thing ever put on a car to promote safety and economy.

THE NICHOLS-LINTERN COMPANY, Cleveland, Ohio, U. S. A.

The Most Successful Men in the Electric Railway Industry read the

**ELECTRIC RAILWAY JOURNAL**

Every Week

*Get your Wants into the Searchlight*





## PAINLESS DENTISTRY *for* GEARS

**Y**OU wouldn't discharge the foreman if he lost a molar. Why scrap a gear just because of a few broken teeth? Why not fill in with new metal—as shown here—and recut? This is only one of a thousand ways to oxweld and reduce costs. Ask us to send you the Bulletin that tells about the advantages of oxwelding in your industry.

Oxweld Acetylene Company

NEWARK, N. J.      CHICAGO      LOS ANGELES

*World's Largest Maker of Equipment for  
Oxwelding and Cutting Metals*







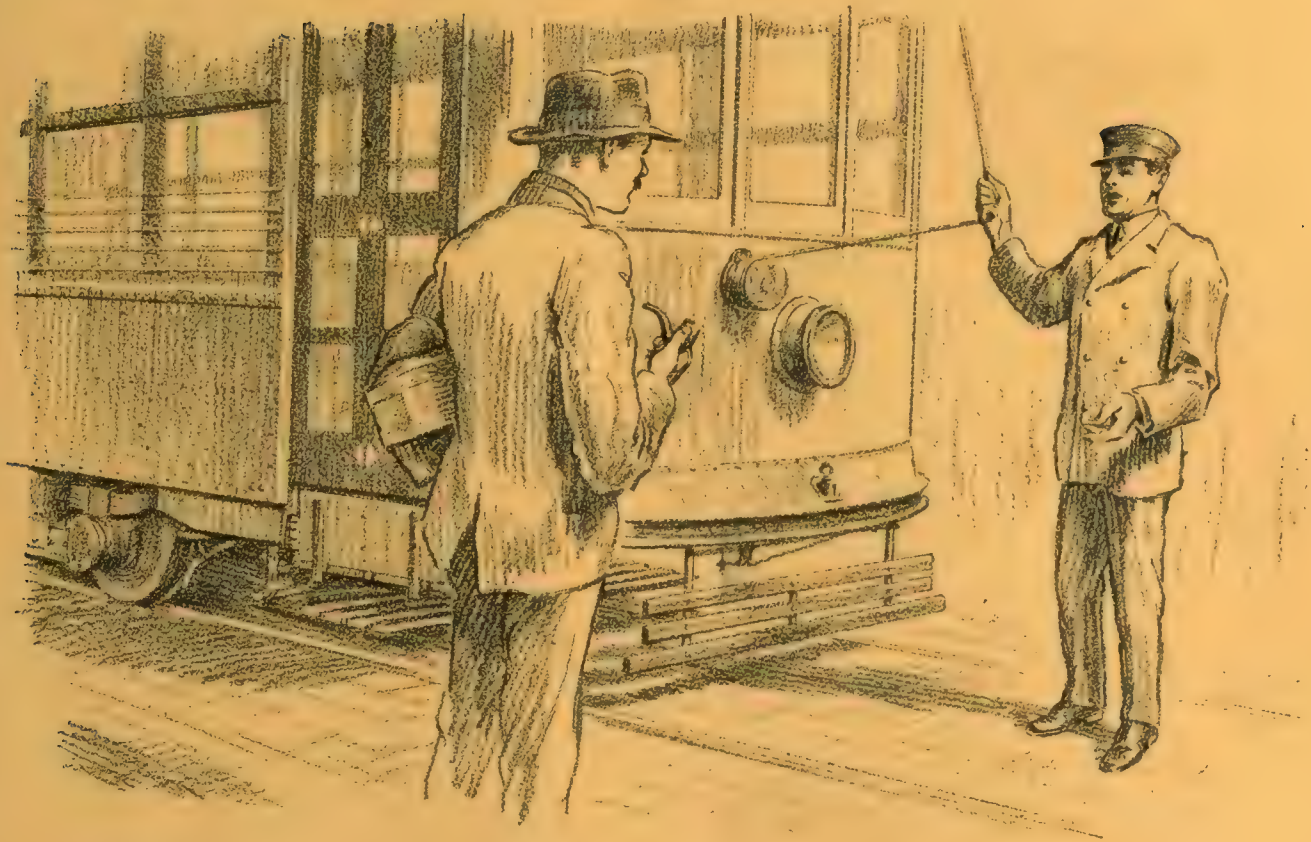
## Both Advertiser and Reader Must Be Satisfied

Naturally you are interested *not only* in the INCOME from your car card space *but also* in the STABILITY of that income. It is because COLLIER SERVICE concerns itself so thoroughly with satisfying its clients that the railway company is assured a permanent income uninfluenced by fluctuating business conditions.

**Barron G. Collier**  
INCORPORATED

Candler Building  
220 West 42nd Street, New York City





## Why Car Men Like Birney Safety Cars

"How do you like running a Birney, Mack?"

"I like it better every day, Pete. Running a light-weight car makes a big difference in making stops and starting up. And the shorter headway cuts down the number of passengers to pick up and let off. So you can always make better time and bring her in on the dot. Knowing you can make the quickest kind of a stop if you have to, not having to take chances with a starting bell, and not having to watch that you don't open or close the door too soon, takes all the worry out of the job. It's a better job every way—all the boys say so."

**R** EPORTS keep accumulating that the car men show a strong preference for operating Birney Safety Cars. This is another expectation that has been fulfilled.

It couldn't have been otherwise as the men are given a car they can handle with greater safety and greater satisfaction in every particular.

In a few of the earlier Birney Safety Car installations a conductor, in addition to the motorman, was put on at the request of the men. They immediately found the extra

man unnecessary and only in the way, and promptly requested one-man operation.

The Birney Safety Car had to win the approval of the car men as well as the public. Its record of success proves that it has.

In fact, the car men deserve a large share of the credit for their cooperation in making it a complete success.

And the shop men are equally strong in their approbation, because the standardized Birney Safety Car facilitates and simplifies cleaning, inspection and maintenance.

THE J. G. BRILL COMPANY  
PHILADELPHIA, PA.

G. C. KUHLMAN CAR CO.  
CLEVELAND, OHIO



AMERICAN CAR COMPANY  
ST. LOUIS, MO.

WASON MANUFACTURING CO.  
SPRINGFIELD, MASS.



# General Electric Curtis Turbines in a 1500-kw. Plant

The Charlottesville & Albemarle Railway, Charlottesville, Va., has been operating one 500-kw. General Electric Turbine since 1911 and one 1000-kw. General Electric Turbine since 1912. These turbines have established a splendid record for economy and reliability.

25-15



## General Electric Company

General Offices:  
Schenectady, N. Y.



Sales Offices  
in all large cities



# ELECTRIC RAILWAY JOURNAL



**THERMIT  
WELDING  
MAKES TRACK  
JOINTLESS**

**Metal & Therman Corp.**  
120 Broadway, New York



# Westinghouse No. 506 The Safety-Car Motor



## The Right Idea

"Joe," said the General Manager to the Superintendent—"the biggest issue of the day is that of making our car lines yield reasonable profit individually. Each should be considered separately and the equipment assigned should fit its specific requirements. Large double-truck cars should operate where and when traffic needs them. It is a great mistake to use these heavy cars throughout, merely because of a few concentrated peak loads during two or three hours each day."

"Yes, boss," answered Joe, "you are unquestionably correct. The selection of all our equipment has been based on the most difficult runs without any consideration of what is best for the remainder of the system."

"There is where we have been wrong," said the General Manager, "railroading, like all other modern business enterprises, demands a detailed systematization, and the employment of every possible economy. We are fortunate in being able to adopt the standard safety car, for your report shows that this car will save us money on the majority of our outlying lines. I have followed your suggestion and doubled our order for these cars, and especially specified Westinghouse No. 506 motors."

Westinghouse Electric

East Pittsburgh



& Manufacturing Co.

Pennsylvania



# Electric Railway Journal

H. W. BLAKE, Editor

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### Study of Return Circuit Conditions in Milwaukee

The Bureau of Standards makes an exhaustive investigation of the conditions. The report recently completed is the first prepared at the request of a public service commission. E. R. Shepard tells of the results.....Page 770

### The Reclamation of Track by Welding and Grinding

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### Manufacturers' Tests of Electric Railway Motors

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# Westinghouse Feeder Voltage Regulators in Detroit

**W**

 WESTINGHOUSE  
ELECTRIC

The **Detroit Edison Company** is an extensive user of all types of Westinghouse Feeder Voltage Regulators—self-cooled, water-cooled and air-blast.

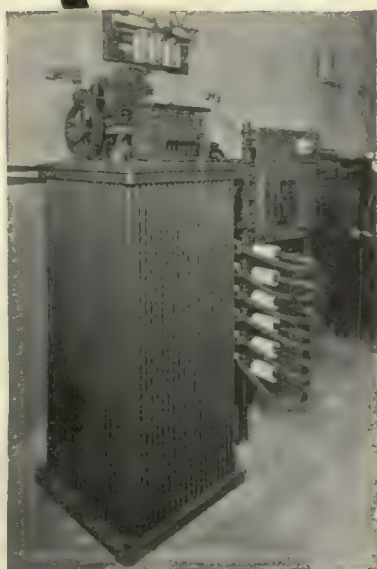
At the **Pontiac Substation** is shown a typical installation of Westinghouse Air Blast Regulators of large capacity, connected to transmission lines.

At the **Dearborn Substation** is shown a typical installation of a Westinghouse Self-Cooled Regulator connected to distribution feeders.

Westinghouse Feeder Voltage Regulators successfully meet the most exacting operating requirements. They can be supplied in all types and for all conditions of service, indoor or outdoor. A complete description is given in Catalogue Section 4-B of Westinghouse Annual Catalogue of Electrical Supplies.



Installation in  
Pontiac Substation



Installation in Dearborn Substation

Westinghouse Electric & Manufacturing Co.,  
East Pittsburgh, Pa.

Sales Offices in all large American Cities

# Westinghouse





# 3 TYPES

- ① Underfeed Stokers
- ② Roney Stokers and
- ③ Chain Grate Stokers

THESE  
ENABLE  
US

Accurately to meet the  
many and varied require-  
ments in the—

## Vast Field of Stoker Application

- Many varieties of coal must be burned.
- The loads to be carried differ widely.
- Mother Earth must be considered when foundation require-  
ments come up.
- Headroom limitations often determine the type of boiler and  
stoker that can be installed.

—First cost is something always to be considered.

From the three types, a choice can be made to [cover practically any  
requirement in stoker application. This variety also enables us more closely  
to meet your individual requirements. And, further, after making  
recommendations based on a careful study of your plant  
conditions and requirements, we can confidently leave  
the choice of type to you.]

Westinghouse Electric & Manufacturing Co.  
East Pittsburgh, Pa.

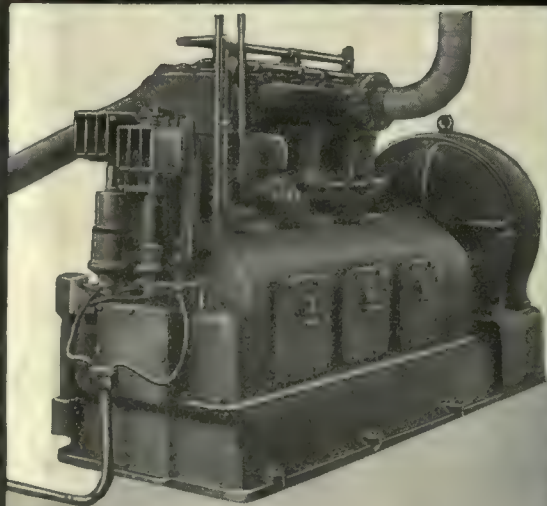
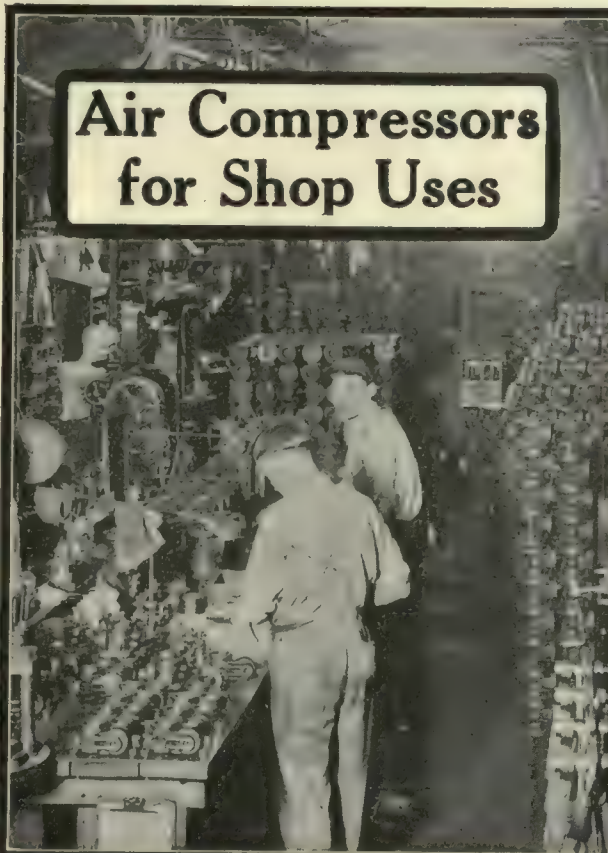
We Can Leave the Choice of Type To You

# Westinghouse





## Air Compressors for Shop Uses



Westinghouse Motor-Driven Air  
Compressor with automatic gov-  
ernor. All sizes up to 550 cu. ft.  
Catalog No. 401.

Compressed Air is a convenient, cleanly  
agent always on tap for railway shop uses.

### Westinghouse Electrically-Driven Compressors

are especially adapted to bench and machine  
use for supplying pressure to blow chips and  
cuttings; also for pneumatic tools and hoists.

## Westinghouse Traction Brake Company

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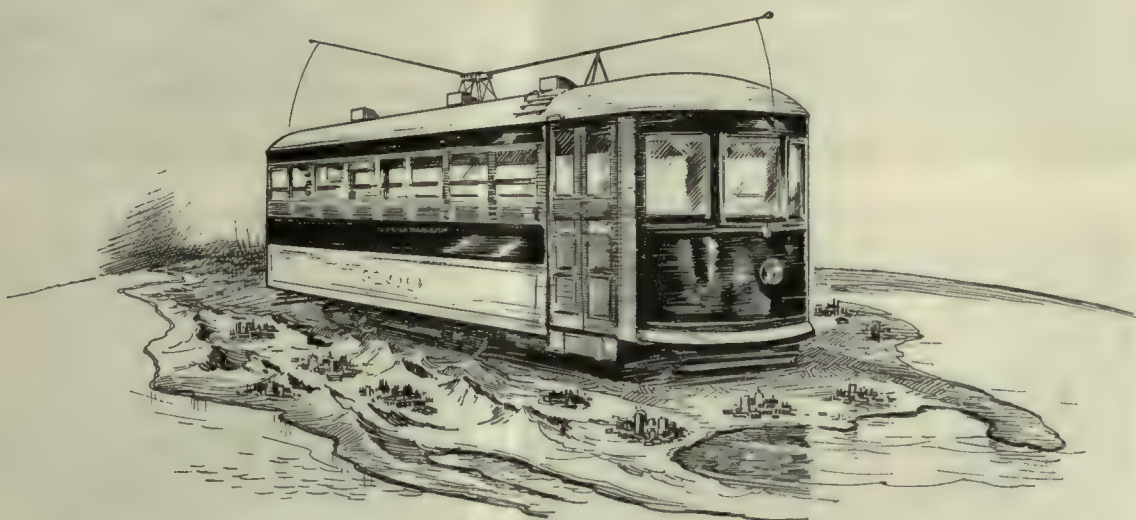
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Seattle, Wash.  
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St. Paul, Minn.





## The Safety Car is Universal

When you order cars equipped with our Safety Car Control Equipment you order apparatus that has proved its right to the name "Universal."

From Maine to Florida, from California to Washington, Safety Car Control Equipments are demonstrating by the hundreds their ability to meet and *improve* upon the service standards of the displaced two-men cars.

The Safety Car, in fact, is the first that has been successfully ordered and used regardless of climate, topography and "local conditions." You cannot go wrong when you order equipment that has succeeded on scores and scores of roads within the brief span of three years.

## SAFETY CAR DEVICES CO.

Main Office—Boatmen's Bank Bldg., ST. LOUIS, MO.

CHICAGO  
Railway Exchange Building

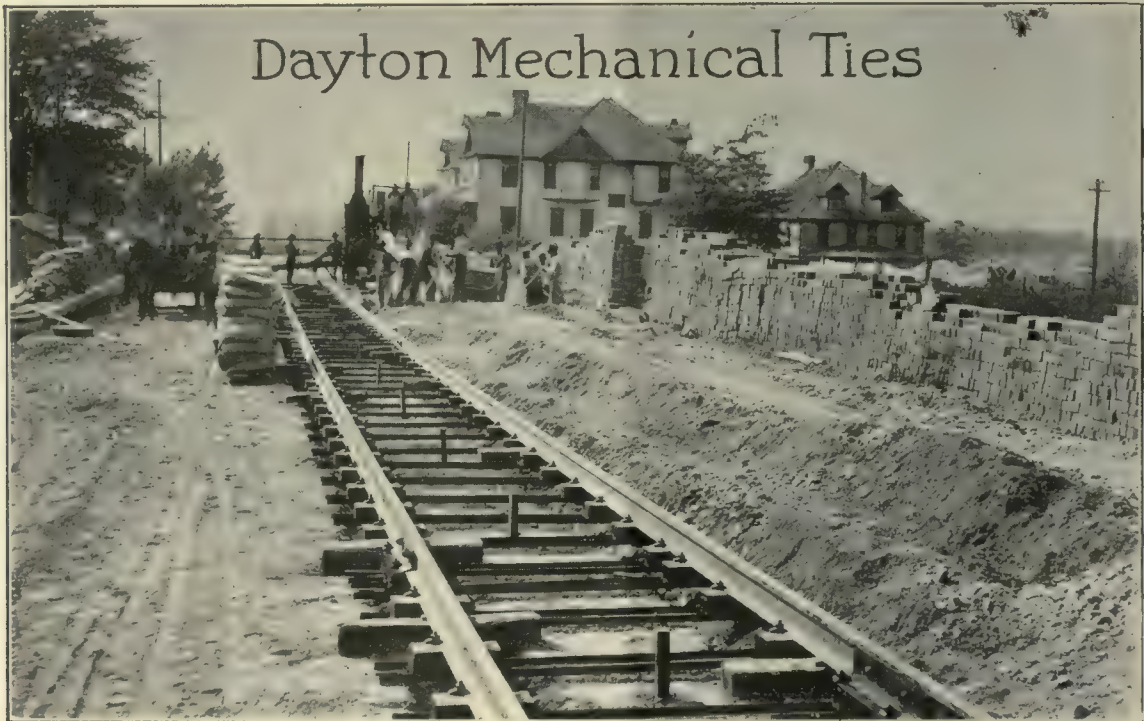
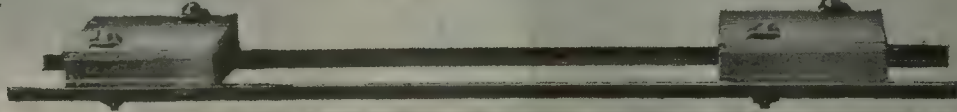
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PITTSBURGH  
Westinghouse Building

CANADA—Canadian Westinghouse Co., Ltd., Hamilton, Ont.



# The MECHANICAL RAILWAY TIE



## Meet That One Overwhelming Demand— Keep Down Costs!

To *keep down costs* is a vital necessity today. WHAT costs? Clearly many miles of track need rejuvenation—and clearly the first cost, while a most important item, must be weighed against final costs. Compare, for instance, Dayton Mechanical Ties with untreated wood ties. The installation cost of the former, labor included, is a *great deal less* than the wooden ties in a gravel ballast. And

you can install Dayton Ties in a CONCRETE roadbed, at that, and still gain marked ECONOMY in first cost. We only touch lightly on final costs—because service has demonstrated beyond argument that Dayton Mechanical Ties are PERMANENT, with the lowest maintenance figures of any form of trackwork.

Ask us to prove this!



THE DAYTON MECHANICAL TIE CO.  
201 Third Street Arcade  
DAYTON, OHIO







# PRODUCTS

*Quality First*



## Good Bonding Starts a Series of Paying Results

When the return circuit is well bonded the most frequent cause of low voltage is removed. And when the voltage is up to normal several good things happen.

Motors pull the cars along on time.

Motors keep cool so that most burnt-out armatures are avoided.

Juice stays in the track and power costs are lowered—overloaded equipment is relieved.

Car lights and headlights are bright.

Good bonding pays.

O-B Bonds are good bonds.

*Send for new book, "The Return Circuit." It goes to the heart of its subject.*

**The Ohio Brass Company, Mansfield, Ohio**



Railway Track-Work Co.

30th and Walnut St.

Philadelphia, U.S.A.

**Fabrica de GAZ**

Fogões economicos por aluguel.  
Aquecedores para banheiros. Luz  
Lustres de gaz e luz electrica em  
combinação e fornos a gaz para  
engommar.

**Abastecimento de AGUA**

Para agua quente, com  
matka que impede  
aquecedores  
divido.



**LABORATORIA**  
Análise de asfalto, pisa  
refinado, carborundó e oleos espe-  
ciais para a fabricação de desin-  
fectantes.

**FORNECIMENTOS**

De aterro, pedra britada e saibro  
branco. Calçamentos a paralele-  
pipedos e factura de passeios.

**FUNDIÇÃO**

De ferro, metal e aluminium

Gentlemen:

I should be obliged if you would forward me  
particulars of your Reciprocating Track Grinder, as  
we are thinking of purchasing a machine of this nature.  
Our present grinder is one of the type manufactured by  
\_\_\_\_\_ but as it is not a reciprocating  
one, its field of usefulness is limited.

Our system is 550 Volt. D.C. and our gauge  
135 centimeters.

Yours very truly,

\_\_\_\_\_  
General Manager.

JHE.

# The Voice of Experience

If the experience of this South American company in connection with track grinders stood by itself alone it would hardly be conclusive enough to be of importance. But it is precisely the same as that of scores of electric railways in the United States who have found that the

## Reciprocating Track Grinder

is the only machine that answers the demands of every condition and does the work cheaply, efficiently and thoroughly.

You can prove this fact to your satisfaction on your own tracks at our risk.

**RAILWAY TRACK-WORK COMPANY**  
30th and Walnut Streets, Philadelphia



No More Concrete Than  
the Paving Requires with

**INTERNATIONAL  
STEEL TWIN TIES**

Street traffic loads require a foundation slab of concrete on average soils about 5 inches thick.

With Steel Twin Tie Track it is possible to carry track and paving loads on a 7" slab of concrete, because the concrete is placed in bearing 5/16 of an inch under the base of the rail and the load is distributed over an area that shows a big factor of safety—10 times that required with 25 ton cars figuring concrete in compression at 250 per square inch.

Consequently Steel Twin Tie Track is carrying 65 ton interurban equipment and heavy vehicle traffic in ten large cities in the United States.

We want only the opportunity to apply the money saving principles of Steel Twin Tie construction to your particular problem.

Conventional designs bring conventional results. You know what they are.

A short note or wire will bring a concise statement of the progressive possibilities of Steel Twin Tie Track.

Rehabilitating  
double track  
on Broadway,  
Cleveland, Ohio

**The International Steel Tie Company**

Manufacturers of Steel Twin Ties and Crossing Foundations  
General Sales Office and Works: Cleveland, Ohio



# Phono-Electric

## On the Williamsburg Bridge

On this great structure the successful operation of 270 cars an hour over grades up to 4.6 per cent depends upon Phono-Electric — the wire that best defies wear and weather.

BRIDGEPORT BRASS COMPANY

BRIDGEPORT



CONNECTICUT

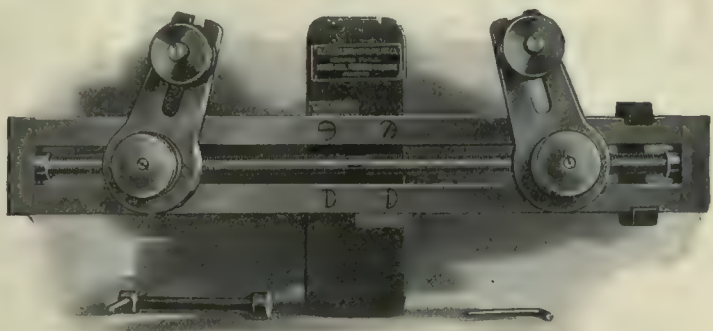


# Segur Coil Winding Tools

The line of Segur Coil Winding Machinery is complete and every machine is designed to produce work faster and better than past methods of coil winding.

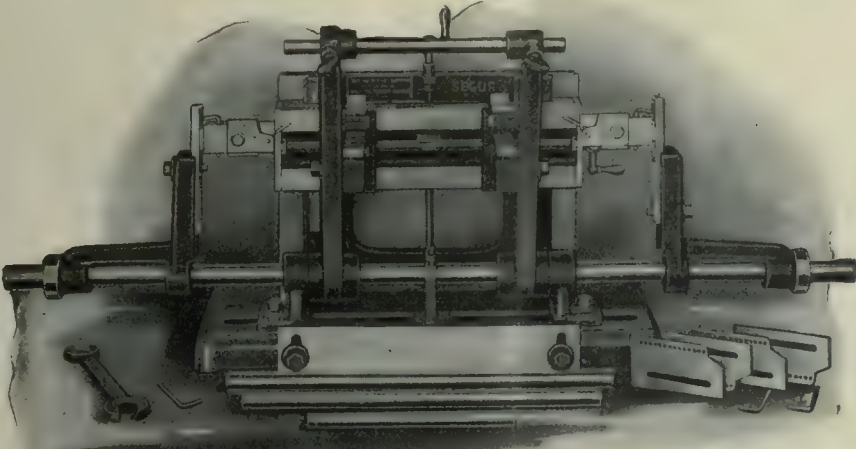
This broad line of practical labor-saving apparatus offers you timely assistance.

Write for data sheets.



*Segur Hair-Pin Loop Winder*

For winding loops from 3 to 36 inches in length. Note the adjustable jaws.

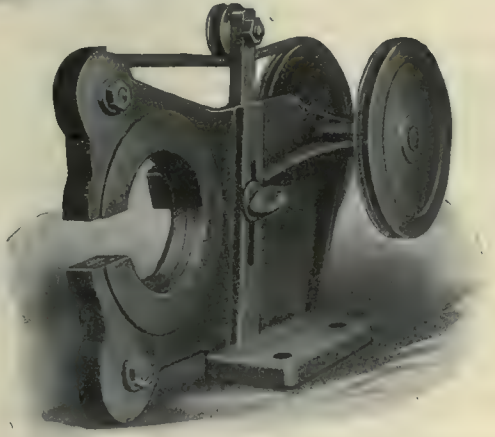


*Segur Coil Spreader*

After the coils are wound on the Segur Winder they are spread or pulled into proper shape by the use of this machine. This spreader is adjustable for coils of practically all sizes and shapes.

*Segur Coil Taping Machine*

After the coils are shaped they are ready for taping and dipping. This Segur Taping Machine with an experienced operator will tape them at the rate of 40 to 50 coils per hour.



## ELECTRIC SERVICE SUPPLIES Co.

*Manufacturer of Railway Material and Electrical Supplies*

PHILADELPHIA      PITTSBURGH      NEW YORK      CHICAGO  
17th and Cambria Streets   337 Oliver Building   50 Church Street   Monadnock Building



# Inspection of Equipment On Basis of Work Done

(Pat. Applied For)

## *The Economy Power-Saving Railway Meter Provides the Safest and Most Efficient Basis for Equipment Inspection*

Most parts of a car require inspection at intervals proportionate to work done by the equipment.

Mileage run between inspections is not necessarily a measure of work done.

Elapsed time between inspections is not necessarily a measure of work done.

Power-On time is not an accurate measure of work done.

None of the time factors of the car operating cycle is a correct measure of the work done by the car.

*Kilowatt-hour consumption between inspections is the safest, most efficient and most readily available measure of work done by the essential parts that wear and need inspecting.*

The importance of these established facts is readily apparent. Consider the following:

1—All electrical equipment depreciates and wears in direct proportion to the energy consumed by the car motors.

2—The wear of truck parts, brakeshoes and wheels depends upon speed, stops per

mile, condition of track, weight, etc., which are the factors determining energy consumption.

3—If a motor is working unsatisfactorily for any reason, such as faulty connection, open armature coils, short fields, etc., more energy will be consumed and the car should therefore be brought in sooner for inspection.

4—If a car is on an easy-schedule line, having infrequent stops and low grades, it will consume less energy than a car operating on a difficult schedule with frequent stops and severe grades. On a mileage or time basis, each car would receive an equal number of inspections. On a kilowatt-hour basis less inspection would be given the car operating on the easy schedule and thus a substantial saving in labor would be effected.

5—If an equipment is unsuited for its service it will consume more energy and should come in oftener for inspection.

6—If a car has tight brakes or nosing trucks, it will consume more energy and come in more promptly for inspection.



7—If a car is handled roughly or improperly by motormen it will consume more energy and, therefore, will need inspection more frequently than one which is properly handled. Inspection on a kilowatt-hour basis automatically shortens the inspection period on the roughly handled car and prolongs the period on the properly handled car.

8—Work done by a car operated by barn forces or when hauling a trailer is not accounted for on the time or mileage basis. The kilowatt-hour basis measures every bit of work done by a car no matter who operates it.

*By providing a method that accurately and automatically shows when inspection is needed, the kilowatt-hour basis also shows at a glance how much more work a car can do before inspection is needed or, in case of road failure, how much work it has done previous to the failure.*

The result is that more thorough inspection is obtained without increased labor cost or the previous standard of inspection is maintained for less car-house labor cost.

*The Economy Railway Meter* in addition to paying for itself in a few months in power saved also provides the means for placing inspection on the energy consumption basis, the most accurate and efficient measure. It has, in fact, been doing just that for nearly a year with unqualified success. The details are in a paper written by a prominent operating engineer which we shall be glad to distribute.

## Car Inspection Dials On Economy Power-Saving Railway Meter

*It Meters the Energy. That's What  
You Want to Save*



### The Watchdog of Your Power and Equipment

This is a rugged watt-hour meter. Top dials for motormen's power-saving records. Lower dials for car inspection use.

When the meter-driven hand on dial A reaches the marker set for this car at 6, the barn man knows that the brakes and controllers have done their work and are due for an inspection equivalent to that otherwise made daily.

Likewise dial B shows when the car has done sufficient work to require oiling. This supplants the usual time or mileage period for oiling.

Dial C shows when the car has done sufficient work to require general inspection.

After any inspection the meter-driven hand is set back to zero by means of its reset rod at the bottom of the case.

A lock prevents unauthorized resetting of inspection dials.

The Economy meter with inspection dials is readily adaptable to any electric car or locomotive operating condition.

It is the only power-saving device whose unit is correct for use in determining when cars should be inspected.

The Economy Railway Meter saves Power and Car House Labor.

***It is the only device that does BOTH.***

# ECONOMY ELECTRIC DEVICES COMPANY

General Sales Agent: Sangamo Economy Railway Meters

Old Colony Building, Chicago

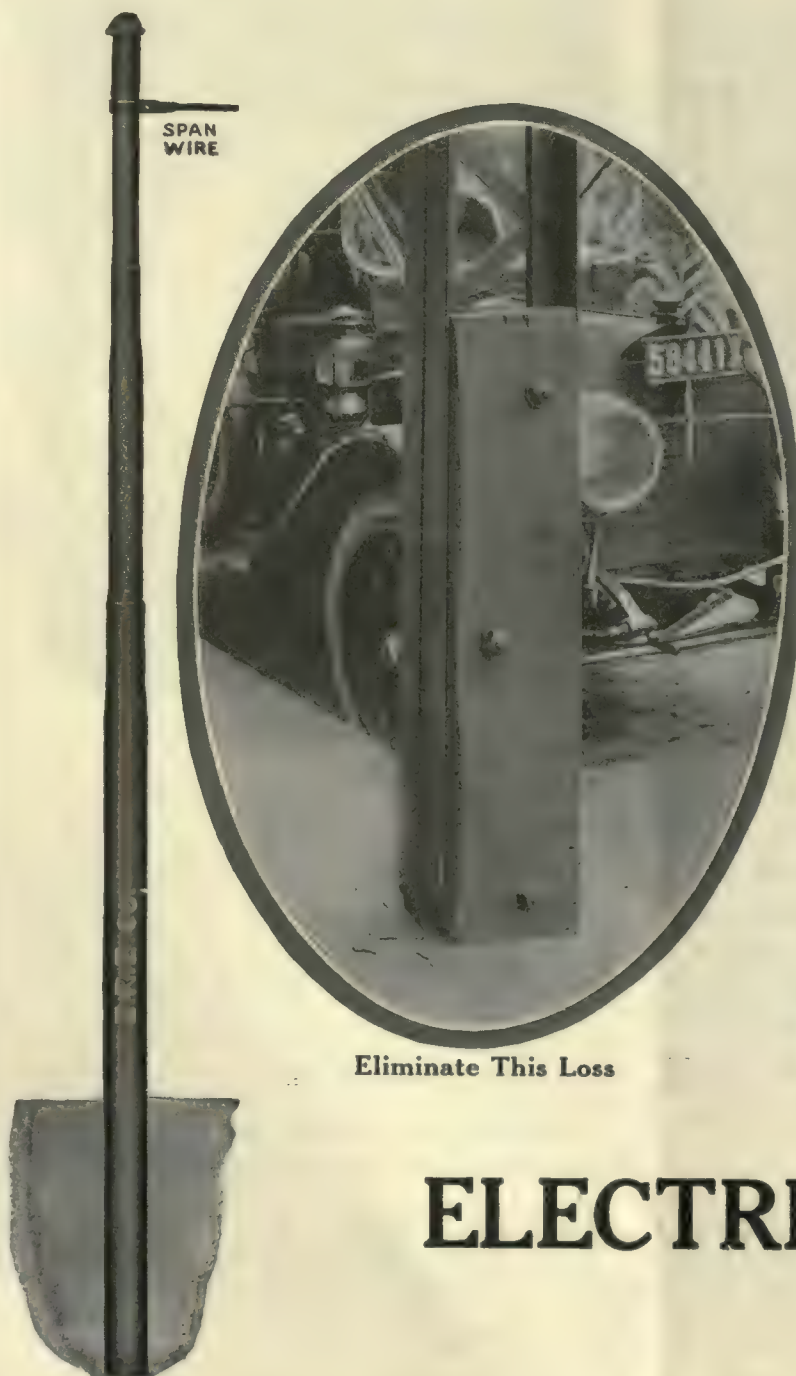


# "ELRECO" TU for Permanent

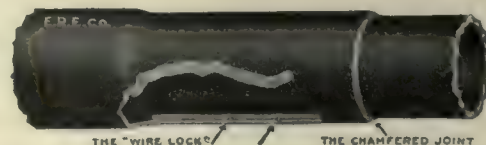
## Steel Poles that make good under all conditions

The keynote of rehabilitation is *permanent construction* rather than cheapness. The illustration shows the evils of deterioration. Pole corrosion such as that pictured on this page is expensive and pole failure may bring damage claims as well as lowered prestige in the eyes of an already too-critical public.

Hundreds of thousands of "ELRECO" Tubular Steel Poles are in use today by electric railways and jointly by electric railway, power, light and telephone companies in all parts of the country.



Eliminate This Loss



# ELECTRIC RAILWAY

Cincinnati

New York



# TUBULAR POLES Construction

## Tubular Steel Poles that do quadruple duty

They have made good at all times, as the Best poles, under all conditions.

"ELRECO" Combination poles are straight, graceful, strong poles for trolley, power, light and telephone service combined. "ELRECO" poles are being installed in many of the most beautiful and progressive cities in America. They stand all service strains.

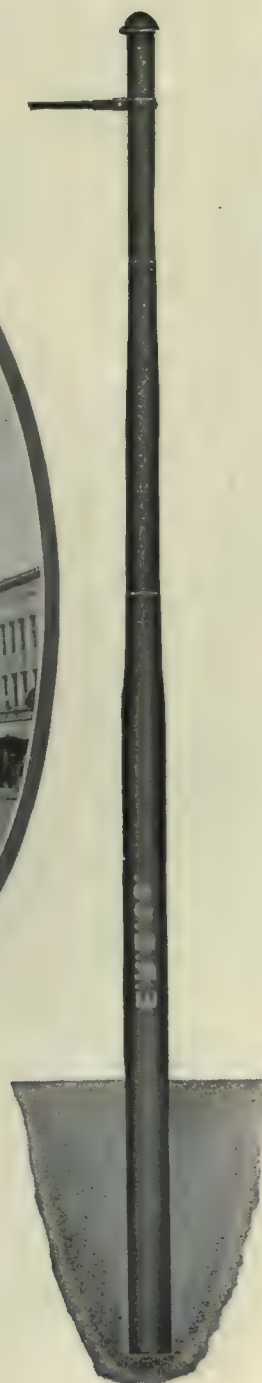
## The Joints Are Stronger Than the Pole

You can safely load them up from any direction, save installation and maintenance costs, and conserve street space.

All orders for these poles can be filled *promptly*, as our usual pre-war steel tonnage is again available.



Achieve This Saving



# EQUIPMENT CO.

Ohio

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# The Electric Railway Industry is "coming back"

AS A GREAT NATIONAL INSTITUTION, *essential to modern civilization, it cannot fail to do so. Present conditions will change. The industry must and will progress. Years of optimism, activity and expansion lie before us.*

AN IMPORTANT ELEMENT *in the return of prosperity on an abiding basis is the widest possible dissemination among electric railway men of information that will help them to improve their service, their finances and their public relations.*

**P**RACTICAL HELPS for the Electric Railway Shop, Track, Power, Line and Rolling Stock Departments supplies this type of information in abundant measure.

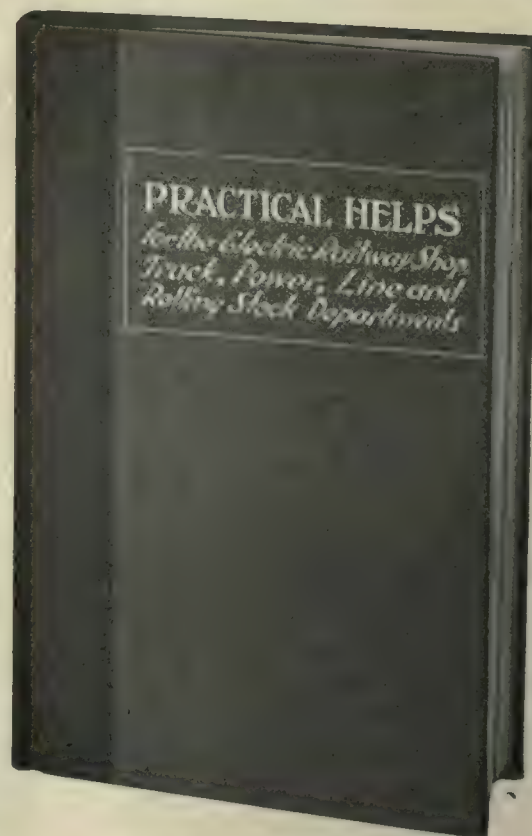
It is a new book, written out of the experiences, investigations and observations of men of recognized ability and of the highest standing in the industry.

**C**OMBINING the authoritativeness of a textbook with the serviceableness of a handbook of present-day practices, it covers the whole range of physical equipment—operation and maintenance, fundamental principles and practical methods, materials and appliances, organization and department economies.

Presenting 29 important articles that were followed with keen interest by the thousands of executives, engineers, operating and non-technical men who first read them in *Electric Railway Journal*—it is a book that belongs on the desk of every electric railway official or department head.

**T**HE BOOK may be secured in combination with a subscription—either new or a renewal—to *Electric Railway Journal*, whose news, week by week, of the thought, activity, practice and progress of the great industry which it serves, is now, more than ever, of vital necessity to the men whose brains and energy will rehabilitate electric railways.

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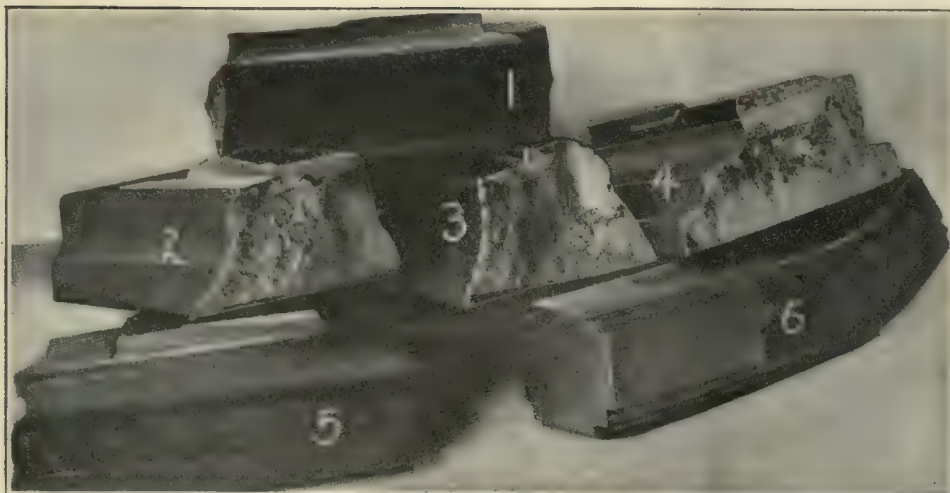
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joint—Each bond has separate  
socket terminal soldered to stub  
end after threading beneath and  
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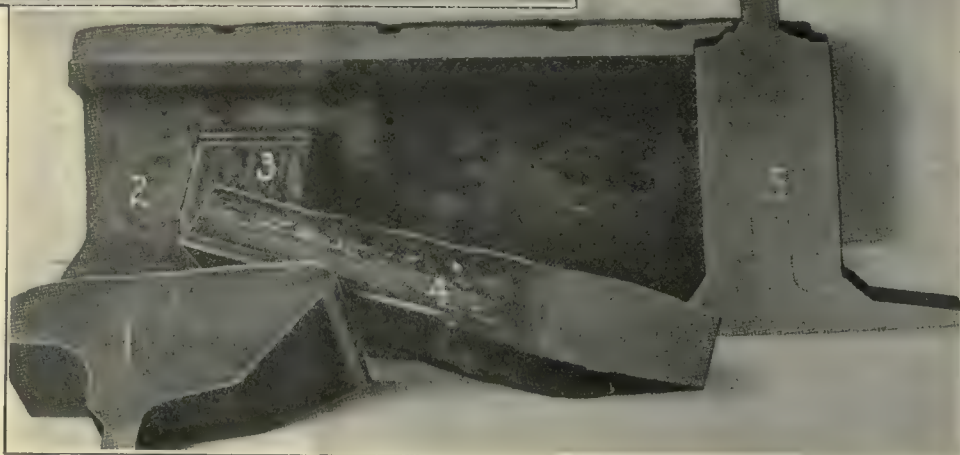
Solid Manganese Track Work is one of our specialties—it can be reclaimed by Electric Welding.



Test pieces of solid manganese, ground and broken through weld. Note the uniform structure. Observe also that there is *no impairment* to the manganese.



- 1—Section of guard rail, groove filled in.
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*Large diameter, deep cylindrical Heel resting on Manganese Steel surface, with adjustable holding device.*

All bearing surfaces carefully ground.

Furnished in either Manganese Steel Centre or Solid Manganese Steel construction.

Specify this switch for your next layout and watch its service.

*Write for complete data.*

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**TAYLOR-WHARTON IRON & STEEL COMPANY**

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Electric, Steam and Industrial  
**TRACK WORK**





## Which Looks Like YOUR Track?

Has the pavement between your rails "buckled up" like the picture in the circle? Or is your pavement perfectly smooth like that in the larger picture? It is and will remain so if you use

# Nelsonville Filler and Stretcher Brick

The picture in the circle could not be duplicated now. This railway company now uses Nelsonville Brick and has a smooth pavement too. Because the ungrouted joint between the filler brick and the stretcher brick does not transmit rail-vibrations—it effectively prevents any "kick-ups" or displacement of brick in the pavement.

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## THE NELSONVILLE BRICK CO.

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There are "BLAW"  
Buckets and Accessories for every  
class of service and for all types of equipment.  
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**I**F the Government is obliged to rely largely upon the banks to take up Government securities who will suffer most?

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And if American business suffers for lack of adequate banking service, the American working man will suffer accordingly.

Make sure that your employes understand that fact clearly.

The success of the Victory Loan is everybody's business.

The enormous task of restoring normal business conditions and prosperity cannot be left to any one group. That task, like the winning of the war, will require the united effort of the American people individually and collectively. And first and foremost it will require that all subscribe as freely and generously to the Victory Loan as to the previous Liberty Loans.

## Unity in effort will bring prosperity as it brought Victory

Anything less will bring commercial suffering as surely as it would have brought military defeat.

It is to the self-interest, as it is to the patriotic duty, of every American business man to bring about a wide distribution of the forthcoming Victory Loan.

Ask for a copy of the booklet

### **The Victory Loan**

**Its relation to American Business and Prosperity**

GOVERNMENT LOAN ORGANIZATION  
Second Federal Reserve District  
LIBERTY LOAN COMMITTEE  
151 Fifth Avenue New York



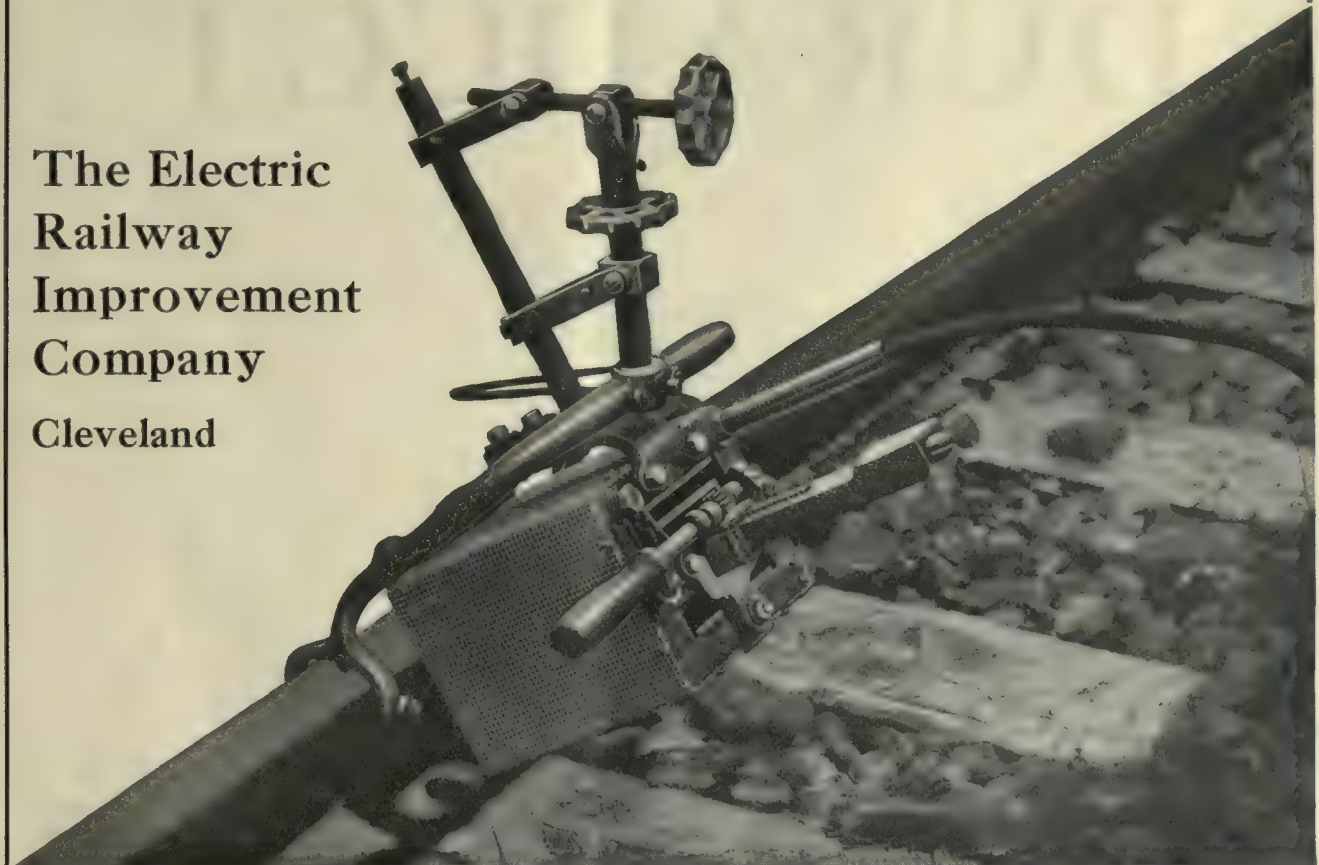
# No Tie-Up or Delay

When a car approaches, the workman has but to lift this ERICO Portable Welder off the track and allow the car to pass without any loss of time.

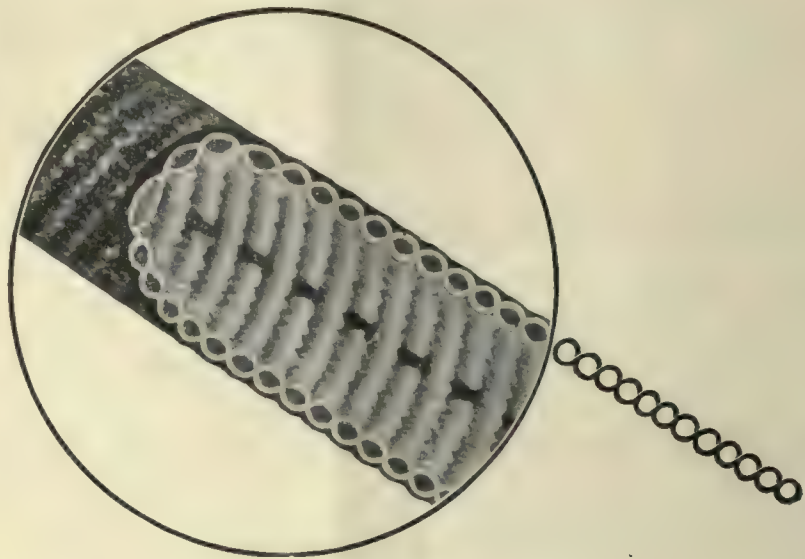
The Welder Portion illustrated weighs 65 pounds complete with mounting. One man can easily handle it.

Don't let your line give the public cause to kick. Win their support for higher revenue.

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Railway  
Improvement  
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The single-wall  
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**DURADUCT**

DURADUCT is the only flexible non-metallic conduit with a single interwoven wall.

It therefore gets away from the breaking down and blistering which is a part of multiple wall construction.

When ordering conduit for your cars don't ask merely for "Loom", but specify DURADUCT.

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THE BLACK DOTTED LINE IS THE MARK OF  
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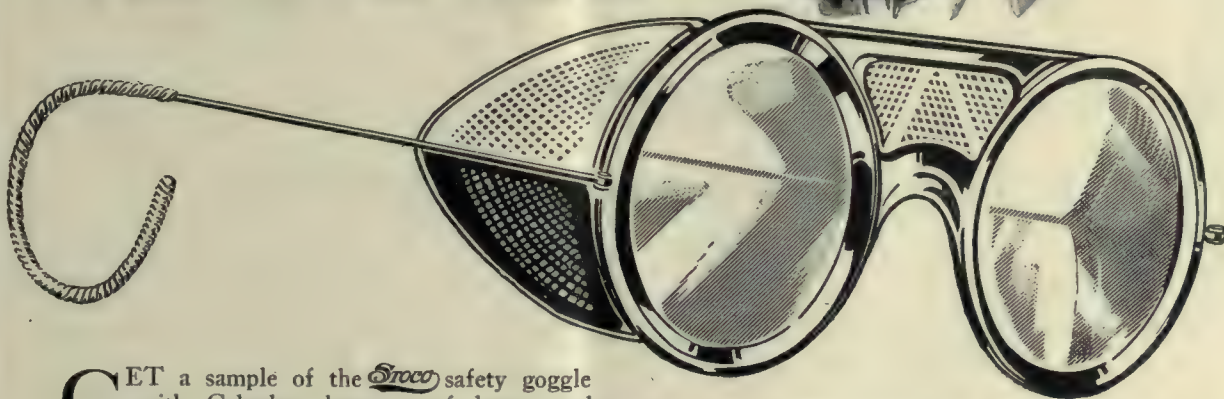
*These*  
**STOCO**

**CELOGLAS**

**SHATTER-PROOF LENS**

**SAFETY  
GOOGLES**

*will make my  
men EYE SAFE*



**G**ET a sample of the *Stoco* safety goggle with Celoglas shatter-proof lenses and show it to your foremen. Have them give it a trial under actual working conditions, and it won't take them long to decide that it's the kind of eye protection their men need.

The *Stoco* safety goggle frame is the strongest ever designed for eye protection purposes. In spite of its sturdy construction it is light in weight and mighty comfortable in use.

*Stoco* safety goggles are supplied with either easy cable earbows or elastic headbands, and also

with regular heavyweight glass lenses or Celoglas shatter-proof lenses. Celoglas lenses have a thin piece of celluloid between two glass lenses. Even though the glass may fracture from a hard blow, the lens will not leave the frame nor will particles of glass fly into the eyes of the wearer.

The price of *Stoco* Safety Goggles with Celoglas lenses is \$115.00 per hundred pairs; with regular glass lenses, \$90.00. Sample free on request to Safety Engineers or Superintendents.

**STANDARD OPTICAL CO.**  
**GENEVA, N.Y.**



# A Tip to the Purchasing Agent

We realize *your* troubles. Here's *one* answer. Make a note now that a reliable source of supply for prompt shipment of *reliable* Insulating Products is IRVINGTON. You can get

## A Word of Appreciation for the Harassed Purchasing Agent

THE purchasing agents of the electric railways have in the few years past had one of the hardest jobs in the gift of the industry, and the job will remain difficult for some time to come. The task of these men is to see that everybody has what he wants when he wants it. They have first to learn what the several departments need, then to locate sources of supply for the required material, and finally to induce reasonably prompt delivery of goods which are ordered. War conditions have, of course, added greatly to the complication of their work, not only because these conditions have caused scarcity of materials and exorbitant prices, but also because of the necessity for establishing priority claims in many instances.

Heads of departments can assist in mitigating the purchasing agent's load by informing him well in advance of anticipated requirements. For example, if it is likely that an unusual number of cars are to be re-modeled next summer a tip to the purchasing agent will enable him to do a little "scout work" for materials now. At least one purchasing agent requests heads of supply-consuming departments to meet him at frequent and regular intervals to go over together the company's prospective requirements. This insures co-operation, prevents the ordering of materials not strictly necessary and permits the exercise of foresight generally.

*Elec. Ry. Journal*

## Irvington Black Varnish Cambric

—and Irvington oiled silk, flexible varnished tubing, special paper for coil windings and black and yellow insulating varnishes — "*what you want when you want it.*" And you can be CERTAIN of high resistance, high dielectric strength, and that the in-



sulation will be non-hygroscopic, chemically neutral and heat resisting. If you will secure *now*, from your department heads, approximate data on your needs, and let us know, we will promptly send samples and further information. FORESIGHT!

**IRVINGTON VARNISH & INSULATOR CO.**  
**Irvington, New Jersey.**



Just a  
Car  
Cashier  
*because of*



## National Pneumatic Door and Step Control

All reasonable objections to women conductors are removed when you equip your cars with National Pneumatic Door and Step Control.

For all that is then necessary to open and close the doors quickly, positively and safely is to push a button, turn a lever or press a pedal as you desire.

The National Pneumatic engines do all the *work*; the conductress does all the *thinking*. Her job is simply that of a car cashier at better than mercantile wages.

Here is the way to settle the problem of putting the *selling* idea on street cars!

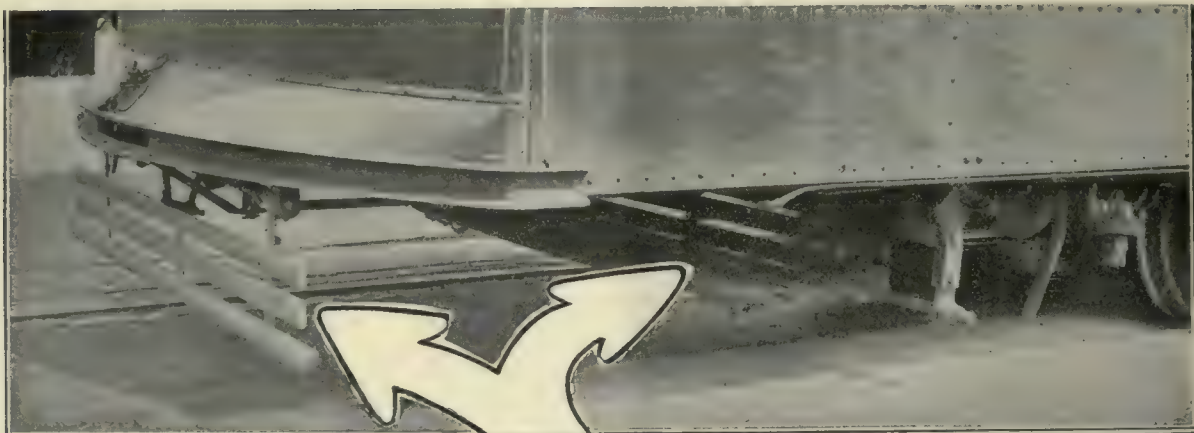
**NATIONAL PNEUMATIC COMPANY**  
INC.

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515 Laflin St. Chicago

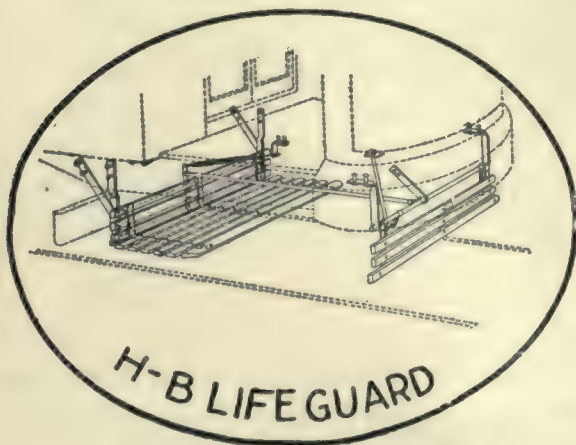




# Barriers of Safety

between the car wheels and the body  
of the fallen pedestrian

## H-B Life Guards



never fail in operation because they work *automatically*. That is what makes them act *instantly*.

Accidents will happen. They cannot be entirely eliminated. But you can prevent front end accidents from resulting in serious injury if your cars are equipped with H-B Life Guards.

**The Consolidated Car Fender Co.**  
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General Sales Agent  
**Wendell & MacDuffie Co.**  
61 Broadway, N. Y.





An officer on board a warship was drilling his men.

"I want every man to lie on his back, put his legs in the air, and move them as if he were riding a bicycle," he explained. "Now commence."

After a short effort, one of the men stopped.

"Why have you stopped, Murphy?" asked the officer

"If ye plaze, sir," was the answer, "Oi'm coasting."—*Pittsburgh Chronicle-Telegraph*.

## Murphy Had the Right Idea

Before the war he had evidently been a motorman operating trolley cars equipped with Arthur Power-Saving Recorders.

He believed in shutting off the power as soon as possible.

And that is the idea which your motormen will get and keep when they constantly have had experience on the



## Arthur Power-Saving Recorder

with its continuous record of "power on" time.

A power saving campaign utilizing the Arthur Recorder pays big dividends to the electric railway company in saving of coal—saving of brakeshoes and other car equipment—safety of operation.

**The Arthur Power-Saving Recorder Company**

Second National Bank Building, New Haven, Conn.





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## FROM FOUNDATION TO FINISH

The word *specialist* sometimes conveys an idea of limitation, but the Thompson-Starrett Company is a specialist in each branch of industrial construction, and at the same time a general practitioner in all.

We ourselves perform direct the major part of all work in our charge, and where, on particular operations, it is deemed advisable to employ specialized engineering talent, we direct it as a part of our own organization.

In other words, even where we utilize supplemental service, we assume full charge and all responsibility.

## THOMPSON-STARRETT COMPANY INDUSTRIAL CONSTRUCTION

CHICAGO

NEW YORK

PITTSBURGH

*Our Advice is as Good as Our Service*





## In Spite of Its Looks—

this picture of one of the principal streets in a leading Western American city is not so "ancient" as it might be thought.

This view of Washington Street, Indianapolis, was made in 1872. That is only 47 years ago and there is many an active resident of Indianapolis in whose memory this scene with its ox-drawn springless wagons is fresh and vivid.

It is the greater part of the marvel of growth in transport methods in America—that improvement has been so extremely rapid.

That the stage coach should have yielded to the horse car on rails—the horse car to the cable—the cable to the trolley—is not at all strange. But that all of these successive steps should have been brought about in less than half a century is a monument to the men who have made such achievements possible in so short a period of time.

This quick moving progress could not have been possible except as every department of the industry kept pace with it. In that respect certainly

## Galena Oils and Galena Service

have carried their full share of the load. Generally speaking, we think it is fair to assume that they have been not laggards but leaders. Which accounts, of course, for their preeminence of use in the field of transportation lubrications.

# Galena-Signal Oil Co.

## Franklin, Pa.



## Why Grade M?

1. Grade M Gears will outwear any grade of gear on the market except case-hardened.
2. Grade M Gears are much less costly than case-hardened gears.
3. Grade M Gears are tough—from records of nine years they show fewer broken teeth than any other type of gear ever offered for sale.
4. Grade M Gears cost less per mile of operation.
5. Grade M Gears cost less per year for maintenance.
6. Grade M Gears have been adopted as standard by sixty-five electric railways in the United States.
7. Grade M Gears have made good wherever they have been tried.



We asked a railway maintenance engineer why electric railways operating under heavy conditions should use

# Grade M

The More Miles-per-Dollar Gearing

Read the seven reasons he gave us.  
Don't they appeal to you?

**General**  **Electric**  
General Office **Company** Schenectady, N.Y.



# Electric Railway Journal

Consolidation of STREET RAILWAY JOURNAL and ELECTRIC RAILWAY REVIEW

Volume 53

New York, Saturday, April 19, 1919

Number 18

## Where Is the Economic Limit in Reclamation Work?

MUCH credit is due the master mechanics and engineers who have kept the electric railways going with little of new materials during the past few years. Repairing has become a real art with them, and the scrap heap has yielded many a repair part that in palmier days would have been sold to the junk man. The possibilities of this reclamation work are so great that there is danger of overlooking the economical limit to which it can be carried. Such a limit obviously exists, although it has probably not yet been approached in most cases. A few months ago it would have been useless to raise this point, for the question would have been settled at once by reference to the impossibility of obtaining any money with which to buy replacement parts or new equipment. As business returns to a more stable basis this condition should not prevail, certainly not to the same extent as during war times.

If the "powers that be," including the public utility commissions, get the notion that railways can be maintained indefinitely by reclamation work they will not feel the urgency of providing new money for betterments. The engineers should, of course, make the most of their ability to repair track, rolling stock, motors, etc., but they should analyze their costs carefully so as to be able to demonstrate the unwisdom of carrying a good principle too far. Good engineering consists in making the dollar go as far as possible in producing results in technical lines. The engineers have performed wonders recently. They cannot be expected to do the impossible.

## Mr. Ford's New Car May Be a Wonder, But—

HENRY FORD'S success with the automobile that bears his name compels one to grant attention to anything new he may project, even though we may be most skeptical of his ability to produce a gas-driven car which will compete with a modern electric car in weight per seated passenger or in all-day operating cost.

This idea, of course, is not new. Indeed, the subject of displacement of the electric motor by the gasoline engine has been under vigorous discussion for five years, especially by those who are so close to the marvels of our most-recently developed prime-mover that they lose their sense of perspective. Reasons favoring the gasoline drive are, briefly, a very low first cost and a fairly low weight when compared to electric car equipment. Reasons against gasoline are a prohibitively high cost of energy and, to some extent, difficulty and expense in maintenance.

Neglecting the two minor reasons pro and con, one is impressed that there may be two possible fields for the gasoline-driven street car; on steam railroad feeder

lines of light traffic and—more important—on city surface systems for use only as an adjunct to handle peak loads. The curse of a short rush hour is one of the worst burdens of the industry and almost anything would be acceptable if it would reduce fixed charges on equipment used only for two hours of the day. During the peak load, also, electric power is expensive, and this goes to offset the high cost of gasoline fuel.

During the off-peak hours, however, the exact reverse is the case. Gasoline for the average day's work of a surface car, costs about four times as much as electric power, under the most favorable circumstances. A 70-ton car making three stops per mile should run 4 miles per gallon of gas, which would make the fuel cost at least 4 cents per car-mile. The same car, electrically operated, would cost about 1 cent for power, and hence the substitution of gasoline-driven units of equivalent size would involve an increase of the order of 3 cents per car-mile. Can any surface railway operator imagine benefits from the gasoline drive sufficient to offset an increase of 3 cents per car-mile in the cost of all-day operation, and also to carry the overhead charges of the equipment discarded? In consequence we don't expect a revolution in the industry, though we acknowledge we are glad to find that Mr. Ford recognizes that city passenger traffic must be carried on rails and not on rubber tires. If he can come through with a substantial, thirty-seat car at about \$2,000, it might help to solve our rush-hour problem.

For the solution of that problem and others even worse we are sure that Mr. Ford can rely upon the co-operation of the progressive safety car equipment manufacturers and operators who have done so much in recent years to accomplish electrically what Mr. Ford believes can be done with an internal combustion engine. Let Mr. Ford see what he can do provided he pays the bills for the experiment.

## Securing Both Unity and Diversity in Engineering Association Work

THERE are three aspects of the work of the American Electric Railway Engineering Association which demand attention, both during the year and at the annual convention. There are, first, the details of each subdivision of the engineering field; second, the more general engineering problems in which all subdivisions are more or less concerned, and, third, the relation of the engineering departments to the whole transportation business. Engineers, like everybody else, are apt to "keep their noses too close to the grindstone," and have in many cases not proved as widely useful to their employers as they might. One function of the Engineering Association is to prevent this, to give its members a wide outlook. Obviously, if engineers are to rise to managerial positions, for which their train-



ing well fits them, it will be necessary for them constantly to be applying in their own departments and outside, where possible, the principles which make for good service to the public. Here is one place, among others, where the association fits in by suggesting how best this can be done.

Much of the committee activity of a technical society must be devoted to routine work—monotonous and boring to anyone but the specialist. Who but he cares whether a  $\frac{3}{8}$ -in. or a  $\frac{1}{2}$ -in. stud is used in a suspension insulator (except as this affects maintenance costs), or whether two or three strands more or less are used in a copper or steel cable? These things are vastly important but they do not conduce to enthusiasm and inspiration. In the case of the Engineering Association they form only the groundwork of its activities. Much more interesting are such matters as automatic substations, wood preservation, use of hand and power tools in track construction, how the welding processes are aiding in reducing maintenance costs, etc. It is extremely important that engineers be wide awake as to developments like these because the management naturally looks to them at least to recommend every possible improvement in the service. In many cases recently the technical men have pointed out conservation possibilities that have greatly helped in keeping the wheels turning when these same wheels showed a marked tendency to stop.

At the coming convention of the American Association the engineers will have before them a great opportunity for holding a meeting unprecedented for interest and helpfulness. This can be brought about by choosing a few live, very live, topics for discussion, and getting men especially well qualified to discuss them. Let's keep detail in the background, arranging if necessary for the specialists to get together in groups to go over matters which affect only their respective selves.

### Returning Soldiers and Sailors Should Make Good Railroad Men

**R**AILWAY companies should not overlook the opportunity now offered of recruiting their forces from the returning soldiers and sailors. Figures of the United States Employment Service show that of those mustered out about 35 per cent are without immediate prospect of positions, yet the training which they have received has been such as to fit them excellently for the semi-military duties and discipline of electric railway employment. They are used to being on time and carrying out instructions, and to be prompt in emergencies, particular in their personal appearance and deportment and conscientious in their execution of work assigned to them. Moreover, each man, before entering government service, had to pass a rigorous physical and mental test. All of these qualifications apply equally well to military and to railway employment. Even for many of the disabled men, railway service affords many openings, as for street inspection, in the shops and substations and sometimes, perhaps, on the platform. The Federal Board of Vocational Training looks out particularly for the disabled men and can explain what provision the government makes for them, while the general subject of securing employment for the returning soldiers and sailors is in charge of the United States Employment Service. Each of these organizations has branch offices in the principal cities in this

country. In addition, many of the returning divisions have appointed committees to help the men from their own division and locality to get back into industry. As a matter of patriotic duty as well as of self-interest the subject should appeal to electric railway companies.

### Rising Costs in Conducting Transportation Offset by Real Engineering

**W**E HAVE more than once referred to the necessity for railway management to see to it that their engineering staffs are adequately paid. The columns of this paper are almost constantly reporting ways and means devised by engineers, which have resulted in exceptionally large savings in maintenance costs. Such accomplishments are not and cannot be wholly the result of extraordinary talent so much as they are the result of a combination of ability and long training in what is now a rather highly specialized field. It is no longer true that almost any man can successfully maintain the equipment, power houses, overhead work and track of an electric railway. Neither the ability nor the length of service for the training so requisite can be had unless the salaries and inducements for advancement are sufficient to secure and hold competent men.

We may be asked why we are referring to this subject at a time when wages in general are soaring. It is because engineering salaries in the electric railway field have not kept pace with wages in other departments of railway service or in other branches of engineering, and because we feel that there is need for careful consideration of the matter by the managements if really competent engineers are to be retained.

The recent presentation of a proposed new salary scale for railway engineers to the government railroad administration by the American Association of Engineers plainly shows that something must be done to provide engineers with salaries at least commensurate with the wages received by mere brawn, if we are not to have wholesale desertions from the railroad engineering ranks in favor of jobs in more lucrative fields. The railway engineer may well ask "Why continue as an engineer when the freight conductor gets the fatter pay envelope?" Mere professional pride will not long offset the high cost of everything which affects the engineer just as much as the freight conductor.

While discussing this matter recently we were asked point blank to explain how the engineers could stop the wage increase for platform men. The answer was ready. We stated that while the engineer could not stop wage increases he could, in many cases, if allowed to have more say or if some of his schemes for savings were earnestly tried, be able to save enough in reduced expense to offset the wage increase. We have in mind a case where a maintenance engineer was permitted to try out one of his theories and the net result was that along one line of effort alone, he effected a saving in maintenance expense which amounted to two-thirds of a \$300,000 wage increase for platform men. We also recall the article in our March 22 issue by W. R. Dunham on rail conservation which gave concrete proof of the fact that the engineers are contributing their full share to keep the industry off the rocks.

The time is ripe for a fuller appreciation of what the engineers in charge of the various phases of electric railway maintenance are doing, and a part of that appreciation should be given through the medium of more adequate salaries.



## Reasons for Thinking

### Prices Will Remain High

THERE are many reasons for believing there is to be no material decrease in the prices of material and labor at an early date and, indeed, that we are on a definite higher-price level. We have already quoted the opinion in favor of this view of Prof. Irving Fisher, who pointed out, in his address at the White House conference on March 3, that our gold reserve is now three times as large as in 1914 and that our credit instruments, in the form of demand deposits and notes, have increased about twofold during the same period. In addition, it is urged that labor will not be satisfied with a reduction in wages, and as the cost of labor is the greatest factor in the cost of all material produced, there is no reason to expect any material change in current prices.

This testimony is strikingly confirmed in a paper on "Prices, Yesterday, To-day and To-morrow," read at the Editorial Conference in New York on April 11 by O. P. Austin, statistician National City Bank of New York. Briefly, Mr. Austin attributes the present increase in prices to the inflation of the world's currency, coupled with the "scarcity demand" and the consequent increase in labor costs. He sees no immediate outlook for a reduction in either factor, so that no general reduction in prices may be expected, in the near future at all events.

If this is the case, it is important in its bearing upon public utilities. There is no use of either a company or the public postponing action on rate cases, hoping, like Mr. Macawber that something will turn up to help matters or that there is some Aladdin who can rub a magic lamp and in some unaccountable way change the situation.

The public is beginning already to think automatically of the present level of prices for most of the commodities which it buys, and the sooner the minds of everybody act in the same way about railway fares, the better. Actually, of course, viewed from the standpoint of the purchasing power of money, electric railway companies are not asking for any higher fares than they had before the war. This is because when measured in commodities and labor, 8 cents or so to-day are worth no more than the nickel was in 1914. The public should be brought to understand, therefore, that railway companies' pleas are not for fares of a higher value than formerly, only that their fares shall not be cut down because of the war.

A previous but exaggerated example of the present situation is the condition in the California mining towns during the gold rush days of '49. Then, according to report, a plate of ham and eggs cost \$5, a pair of boots \$75, carpenters' wages were \$50 a day, and so on through the whole list. The reason for this was just that which exists to-day, namely, a relatively large supply of currency, a relatively small supply of goods or commodities, and a great need of commodities. We are not on the California gold rush basis but we are nearer it than in 1914. There may have been some decreases in price during the past six months in certain of the distinctively "war" materials, like steel and copper, but, on the other hand, there is no evidence of any reduction in the cost of labor which constitutes by far the largest item of expense in electric railway operation. In fact, the demands are for still greater pay and for shorter hours.

All-in-all, the lesson which must be drawn from the present situation is that the sooner we adjust all of our business, including our public utility rates, to existing conditions the better. There is no longer any excuse for living in the fool's paradise of expectations of an early return to pre-war prices.

### Getting Shop Forces Back on a Satisfactory Working Basis

FOREMEN and shop superintendents find the conditions confronting them now in many respects quite as trying as those encountered during the war. While we were actually in the conflict the public was willing to put up with some inconveniences, and it was not over-critical regarding transportation facilities or such incidental matters as the appearance of cars. Department heads had to be satisfied with unskilled labor. Women, old men and boys constituted the bulk of the working forces, and much time was spent devising new methods for using this class of workers to advantage and for training them to fulfill the requirements. Now the traveling public expects the service to be equal or superior to that of pre-war times. Satisfactory service requires efficient maintenance, and this in turn can be accomplished only with skilled labor.

The problem for the employer is first to find a way to offer sufficient inducement to attract the skilled employee, and second to make conditions and surroundings sufficiently agreeable so that the employees will remain. To accomplish this, wages must be kept on a level with the market, and working conditions must be better than the average. The underlying motive for all labor is a desire for gain. All workers must have the necessities of life and all desire some of the comforts. Ambition should be stimulated and if good performance is followed by promotion and higher pay, the laborer is given something to work for which the old dead-level wage system discouraged. There must also be a certain amount of flexibility in rates of wages in order to get the most economical results. The plan of "hiring" men when work is plentiful and "firing" them when work is slack should be replaced by a carefully worked out system of schedules which will spread the work out uniformly over the entire year and so give all-year-round employment. The slack season will thus disappear and the work will be performed better by a smaller force of skilled workmen. For example, if painting schedules are co-ordinated with those for overhauling the equipment, cars can be returned to service in much shorter time and considerable duplication of work can be avoided.

Modern working methods instill confidence in the workmen, make the work more attractive and prevent accidents. Working conditions must be agreeable if the quality of labor is to be kept high. The type of labor needed by electric railways comprises men who can think for themselves and who will remedy troubles because they know from what these troubles result. Supervision must be intelligent if the efficiency of labor is to be increased. Co-operation of managers, foremen and workers with frequent meetings to perfect and work out plans for improvement will raise the standard of the working forces and increase the efficiency of all departments. Such a correlation may prove to be the best first step toward getting the working forces back to a satisfactory basis.



# Bureau of Standards Studies Return Circuit Conditions in Milwaukee

Report Recently Completed Is the First Prepared at the Request of a Public Service Commission

By E. R. SHEPARD

Electrical Engineer of the Bureau of Standards

**D**URING the summer of 1918 the Bureau of Standards supervised an electrolysis survey in the city of Milwaukee. The survey was made at the request and under the authority of the Wisconsin Railroad Commission, following an appeal by the Milwaukee Electric Railway & Light Company to the commission for an investigation as to the adequacy of the protective measures provided by the company for preventing interference with service furnished by public utilities using sub-surface metallic structures. Following the usual practice of the bureau in conducting surveys, a temporary electrolysis committee was organized. This was composed of representatives of several interested utility companies and city departments, and an engineer of the commission who acted as chairman of the committee was also appointed. The members of this committee acted for their respective companies in all matters pertaining to the survey and jointly supplied such labor, material and transportation as were required. Several technical assistants were furnished by the railway company and the Wisconsin Telephone Company, and through the employment office of the former additional help was secured. The railway company and the telephone company each furnished a motor truck for the work and the other companies, when called upon, supplied help to aid in making measurements on their particular systems. An engineer of the commission was detailed to the work. He devoted practically his entire time to the investigation, which was in progress for about seven weeks.

Several meetings of the committee were held at which the progress of the work was reviewed and plans for improving conditions were discussed. These meetings were of an informal nature, and they were not confined to the committee members. The large attendance and active discussion at these meetings was evidence of the importance which the companies attached to the subject of electrolysis investigation.

About 120 pairs of wires were loaned by the Wisconsin Telephone Company for the period of the survey

and these were used as pilot wires for making overall and potential gradient measurements on the tracks. An accompanying illustration shows the installation of one of these pilot wires across a wood-block pavement to its point of connection to the track. Various methods were employed to protect the wires where they crossed paved streets. The wires were usually buried between wood or stone blocks or laid in a narrow trench cut in asphalt pavement. These pilot wires, which were connected at practically all important intersections on the track network, were trunked through to a terminal board in the Grand Exchange of the telephone company. A map of the traction lines was mounted on the terminal board and the pilot wires were terminated in binding posts attached to the map at the points corresponding to the field connections. This arrangement greatly facilitated the making of measurements and afforded considerable interest to lay visitors as well as to engineers.

In an illustration on page 772 is shown the test board with five Bristol, smoke-chart, recording voltmeters connected for track gradient measurements.

The following observations were made with recording voltmeters: Twenty-one over-all potential measurements on the tracks; 172 track gradient measurements; 230 potential difference measurements between water hydrants and tracks; thirty-five measurements of current flow on insulated negative feeders; fourteen measurements of current flow on water pipes.

Indicating instruments were used to make potential measurements between cable systems and other structures as follows: Wisconsin Telephone Company's cables, 190 locations; the Milwaukee Electric Railway & Light Company's cable, ninety-four locations; city cables, seventy locations.

A number of miscellaneous measurements and observations were made in addition to those enumerated. The Western Union and Postal Telegraph Companies made the records of their annual surveys available to the bureau, so that additional measurements on these systems were considered unnecessary.



LAYOUT OF INSULATED RETURN FEEDERS



Following is a brief resumé of the facts as brought out in the report of the Bureau of Standards to the Wisconsin Railroad Commission.

Considerable electrolysis of water and gas mains and services occurred in early years, principally in the vicinity of the Oneida Street station which for a time was the only source of railway current in the city. This trouble was somewhat mitigated by bonding the watermains to the return circuit at a number of points. Damage to underground structures has continued, but in recent years has been much less severe than formerly. Gas service pipes have been damaged in some locations by discharge of current to drained cable systems with which they come in close proximity.

The number of supply stations has been increased to five within the limits of the city proper and a large amount of negative copper has been installed for the

some supplementary pipe and cable drainage, have greatly improved electrolysis conditions in all areas. Track gradients and overall potentials have been reduced to reasonably low values, and the additional protection required for the pipes in some districts can be secured by minor and auxiliary improvements.

#### LARGER PART OF CURRENT RETURNS OVER INSULATED FEEDERS

The insulated negative feeder system in the central district of the city is shown in the accompanying map. It will be noted that two power stations operate in this territory, but as they are close together and their negative buses are connected by heavy tie lines they must be considered as a single station from the standpoint of return current. The total average load on these two stations is 7065 amp. of which 4935 amp., or



TESTING FORCE IN ACTION

sole purpose of reducing electrolysis. Between 1900 and 1912, the railway company installed upward of 350,000 lb. of bare, negative cables to supplement the rail return. This copper was connected in parallel with the tracks and was very effective in increasing the conductivity of the return circuit and in shunting open rail joints. Electrolysis conditions were greatly improved by the installation of this copper, although equally good results could have been secured with greater economy by the use of insulated negative feeders and good track bonding.

Since 1912 the railway company has installed about 420,000 lb. of copper as insulated negative feeders, most of which is in the form of lead-covered cables in ducts. This installation is said to have cost more than \$114,000. A large part of this copper was installed in 1916 and 1917, and some feeders were not installed until September, 1918. In 1917 the Twentieth Street substation was converted for three-wire operation and has since been operated in that manner during the morning and evening peaks.

These various mitigative measures, together with

70 per cent, is returned by the insulated feeders and 30 per cent by the resistance taps to the tracks immediately adjacent to the stations. In the three other substation districts the percentages of the total loads returned by the insulated feeders are 71.5, 62.7 and 63.5 respectively. In the central district there is in use 35,400 lb. of copper per 1000 amp. of average load in the form of insulated negative feeders and for the five stations combined the value is approximately 32,700 lb. per 1000 amp. In St. Paul, Minn., where the Bureau of Standards made a similar study in 1917 and where a fairly adequate insulated negative feeder system is in use, the corresponding figure for the entire city was found to be approximately 35,700 lb. per 1000 amp. of load.

The average value of the twenty-one overall track potential measurements was 5.6 volts, and three exceeded 10 volts. Similar measurements made in Omaha in 1916 gave an average value of 10 volts for the thirty-three "overalls" taken, seventeen of which exceeded 10 volts. No insulated feeders were employed in Omaha at that time and these values have since been very greatly



reduced by the adoption of three-wire operation. In 1917, twenty-three overall measurements were made in St. Paul, the average being 6.2 volts, with four exceeding 10 volts.

#### PIPES POSITIVE IN RAILS IN MANY CASES

Of the 230 potential difference measurements between water hydrants and tracks, seventy-seven showed the pipes to be positive to the rails. In thirty locations the pipes were positive by more than 0.5 volt and in seven locations by more than 1 volt, all quantities being average values.



PILOT WIRES INSTALLED IN WOOD-BLOCK PAVEMENT

The recommendations embodied in the report do not call for a further extension of the insulated negative feeder system, although some minor changes in the existing system are suggested. Electrolysis conditions during the three-wire operation in the Twentieth Street district were found to be greatly improved, and this form of operation is recommended for the Clinton Street substation district in the southern part of the city. It is strongly recommended that all rail joints having resistances in excess of 10 or 12 ft. of adjacent rail be repaired as rapidly as conditions permit and maintained to that standard.

In locations where the pipes are found to be positive to the tracks by more than 0.5 volt after other improvements are carried out, restricted and supervised pipe drainage is recommended to take care of the residual potential. Some of the drainage connections which were made years ago are still in service but the currents carried by them have been greatly reduced by the installation of negative return feeders. One of these for which records are available connects an 8-in. cast-iron water main at Third and Poplar Streets to the negative bus at the Commerce Street station. In 1911 this cable carried 308 amp.; in 1912, 133 amp. and in 1918, 29.7 amp. This is an excellent example of the difference between pipe drainage as a primary and as a secondary means of electrolysis mitigation. General and specific recommendations for the protection of the various lead cable systems are included in the report.

The need for a permanent electrolysis committee is emphasized in the following concluding paragraph of the report:

"If the full benefits of this investigation are to be attained, it is of the greatest importance that steps be

taken to establish some kind of a permanent organization through which the various interested companies and city departments can co-operate to maintain adequate electrolysis protection. The recommendations contained in this report are, in some instances, necessarily indefinite and conditional, and their adoption will require co-operation on the part of the several companies. Extensions of underground structures and changes in the railway negative circuit will call for partial surveys and additional mitigative measures from time to time. All of these matters make it imperative that a continuing committee be established if future, as well as present, protection is to be secured."

Such a committee was organized on Jan. 6, 1919, and arrangements were made for quarterly meetings. Following is the personnel of the committee: R. B. Brown, general manager, Milwaukee Gas Light Company, chairman; G. G. Post, electrical engineer, The Milwaukee Electric Railway & Light Company, secretary; H. P. Bohman, superintendent Milwaukee Water Department, treasurer; W. D. Hobbins, engineer Wisconsin Telephone Company; C. H. Jones, electrical engineer Chicago, North Shore & Milwaukee Railroad; F. W. Walker, general manager Milwaukee Northern Railway, and E. F. Jeffrey, engineer Western Union Telegraph Company. In addition to the above a representative of the Wisconsin Railroad Commission is to be present at each meeting, but he will be a non-voting member.

The cost of the survey, which totaled \$3,165, was divided among the several interested companies. A large part of this was entailed in connection with the installation of the pilot wires and did not represent a cash outlay as the work was performed by regular field crews of the telephone and railway companies which took care of it in addition to their regular duties. Only the



TEST BOARD AND RECORDING INSTRUMENTS IN TELEPHONE EXCHANGE

field service of the bureau engineer was charged to the job, the report being prepared at Washington at the expense of the bureau.

The Birmingham Railway Light & Power Company, Birmingham, Ala., has started operating its new brass foundry. From now on, brass parts necessary for replacements and for the repair of cars will be cast in the company's own shop.



# The Reclamation of Electric Railway Track By Welding and Grinding\*

In This Article the Virtues of Various Types of Welding and Grinding Equipment Used by The Connecticut Company Are Discussed and Their Adaptability to Various Requirements Is Pointed Out

By H. JACKSON TIPPETT

Assistant Engineer The Connecticut Company

IN 1914 the management of The Connecticut Company approved a request of its engineering department for the purchase of power tools and equipment, for the purpose primarily of using them in arresting the rapid deterioration of the rail joints in general and of those in paved streets in particular. In the perfect track structure in city streets, the life of the whole track is determined by the life of the rail, and the life of the rail itself by that portion most liable to injury, namely, the rail

end. It will probably never be known how many have been the attempts to solve the problem of constructing a perfect rail-to-rail connection. Recognizing the fact that the rail connections are the weakest points in the track structure, efforts have continuously been made to increase the length of rails and thus to decrease the number of joints. The economical limit has for the present been reached at 62 ft. What must have been the anxiety of the track maintenance man when the rails as originally laid were 3 ft. long or twenty times as numerous as at present?

Before the introduction of rail-grinding machines there was no satisfactory way of overcoming the dis-



A BADLY-CUPPED T-RAIL JOINT

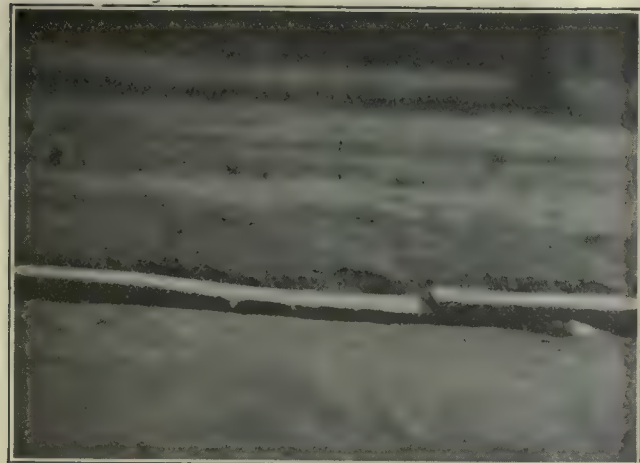
tortion of the rail head at the rail end. Every effort was made to arrest it by the use of better foundation, better rail support on the tie and better mechanical rail fastenings. Hardening the rail steel itself by increasing the carbon content was also resorted to. Investigation into the cause of rail failures showed that rails from the same mills, of the same section and weight and rolled at the same time, were often not exactly the same in height and head dimensions. The differ-

ence was so slight that many considered it negligible but therein lay the root of rail joint trouble when a joint otherwise perfect had been made.

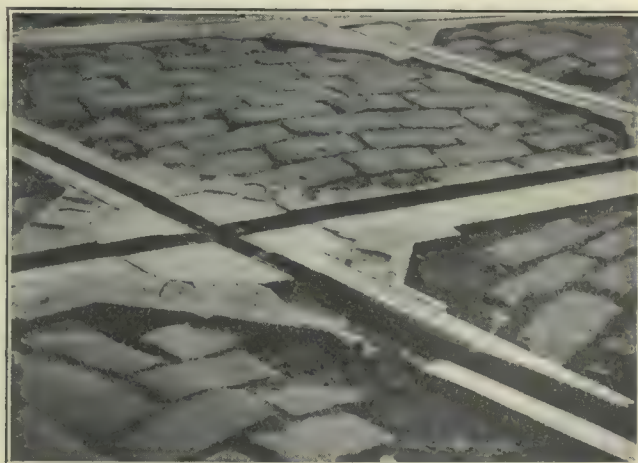
## GRINDING MACHINES HELP ELIMINATE THE TROUBLE

Once the importance of this fact became fully recognized among engineers, means of removing this inequality in rail heads by grinding were adopted throughout the country. Many engineers now grind new rail ends as soon as possible after they are connected up and paved in. This grinding is, of course, of a very light nature and is purely a preventive measure, but its value cannot be overestimated.

The purchase of a Reciprocating grinder was author-



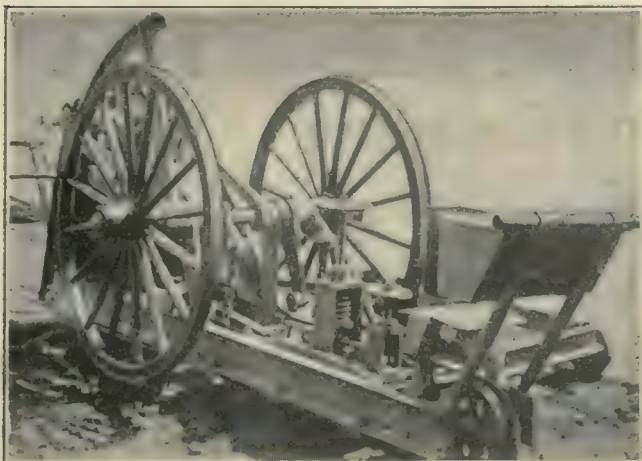
BROKEN JOINT ON NEW BRITAIN AVENUE, HARTFORD



BROKEN RAIL HEAD IN CROSSING FROG

\*Abstract of paper read before the Connecticut Society of Civil Engineers of New Haven, Feb. 18, 1919.





RECIPROCATING TYPE OF GRINDER

ized in December, 1912, for use in the New Haven Division of this company. This machine is eminently suitable for "preventive" grinding work on new track. It is a grinder of the planing or scrubbing type. The mechanical arrangement for producing the planing action consists of a crosshead and block holder, which slides bodily in guides and is driven by a simple crank motion and connecting rod from a 3½-hp. motor taking its power from the trolley wire. The larger hand wheel shown in the illustration of this machine regulates the pressure of the grinding blocks on the rail, while the smaller wheel holds the blocks to prevent end play and adjusts them for vertical wear. The length of the grinding surface is 17½ in., the stroke is 5½ in. and the speed is 350 strokes per minute. This machine is the largest and most expensive of those used by this company, which has now five of these machines with two more on order. More than 20,000 ft. of rail was ground with this type of grinder in Bridgeport alone in 1918.

There is another type of rail failure that can be successfully reduced by the use of this machine, that is rail corrugation or the breaking down of the steel in the rail head into a series of regular waves. This creates a condition of rail which is often more widespread in its damage to pavement and rolling stock and more annoying from the noise caused than bad joints are. It is a noteworthy fact that corrugation is much more in evidence on grooved rail than on T-rail.

The Stow grinder shown in another illustration has been used for many years for grinding in a small way. Its particular field of usefulness, owing to its flexibility, is around special work where grinding in the groove is required. A new method of track reclamation appeared late in 1912, with the advent of the electric arc welder. To J. M. Yount, master mechanic United Railroads of San Francisco, must be given the credit for developing and adapting the process of electric arc welding with the use of the metal electrode to general repairs



GRINDING A GROOVE IN SPECIAL WORK

on electric railways. Of the various arc-welding processes, this method has at present the widest use. The purchase of the first Indianapolis arc welders by The Connecticut Company was authorized in 1914 for use on the Hartford division. Since that time similar welders have been furnished to four other divisions. In an accompanying illustration from a picture taken on Park Avenue, Bridgeport, the welder is seen mounted on four wheels. It consists of a battery of resistance grids. The current is drawn from the trolley wire at about 600 volts and the voltage is reduced by the resistance to about 250 across the arc. The metal rod in the hands of the operator forms one electrode and the rail forms the other. The rod acts as electrode and filler at the same time, automatically attaining the melting temperature and being deposited in a molten state at the point of contact with the rail. The operator wears a hood to protect his face, and colored glasses to neutralize the ultra-violet rays and prevent damage to his eyes. The work is screened from the view of the public for the same reason.

A cupped rail should not be surface welded if there is any vertical movement between the rail ends. The first operation necessary before welding is to tighten up the joint. If the plates are badly worn, mere rebolting will not prove effective for long. This has led to the expedient of first welding the old plates to the rail after they have been cleaned off and bolted up as tightly as possible. A fourth illustration shows a badly cupped

T-rail joint on Grand Avenue, New Haven. Prior to the use of the arc-welding process the repair of such a joint would have necessitated cutting in a new piece of rail, usually about 4 ft. long. While this would allay the trouble temporarily, it left the job with two joints to be cared for in future in place of one. A broken rail, on New Britain Avenue, Hartford, is shown in another illustration. This joint was welded in 1911 by the Lorain method. The joint bars held perfectly, as is



REPAIRING A BAD JOINT BY WELDING, ON PARK AVENUE, BRIDGEPORT



invariably the case, but the rail head broke above the bar. The repair was effected by welding in another piece of steel between the under side of the rail head and the top of the bar. In another case the break occurred around one end of the Lorain bar. To connect the two broken rail ends an old fishplate was cut to fit around the Lorain bar over the break and the plate was welded around its edges to the rail. There is at present no practical method of testing the strength of arc-welded rail joints in the field. The conductivity can be tested, which is an indication of electrical soundness, but high conductivity is not a proof of mechanical soundness. However, sample joints can be made in the shop or yard to which tests for porosity, soundness and strength can be applied.

Much valuable surface-welding work has been done on the open-hearth steel in special track intersections. A photograph is reproduced to show a piece broken out of the rail head in a crossing frog in Bridgeport. If the break in the web of the rail is not too low in the surrounding casting, it can be built up by welding and the missing fragment can be replaced with new steel to avoid the renewal of the whole piece. At present the bulk of welding in special work lies more especially in building up the cups in open-hearth rail, which occur most noticeably on the "leaving" side of the manganese hard centers.

#### WELDING MANGANESE CENTERS WAS NOT SUCCESSFUL

Attempts to surface-weld such alloys as manganese steel centers in switches, mates and frogs by the bare-metal-electrode method have not been successful. Since the chief characteristics of manganese steel are due to its heat treatment and manganese content, any action tending to disturb the effects of the heat treatment or burn up the manganese is detrimental. The welding of manganese centers, if done at all by this method, should only be carried out as a last resort in an attempt to secure a temporary repair until a new center is



GRINDING A WELDED JOINT WITH A ROTARY GRINDER

received. In using the welding method, the welded metal on the top of the rail is left a little high and requires grinding down to a fine surface. The machine which we use to do the bulk of this work is the Seymour grinder as shown herewith.

The rotary grindstone of this is driven by a 3-hp. motor at a speed of 2500 r.p.m. Before the method of surface-welding cupped rails became general this machine proved valuable for grinding out the cup or depression. This, in reality, was merely spreading the low spot over a greater length of rail. It was done by first placing the rotary stone at the bottom of the depression and then offsetting the two wheels eccentrically on each side. Then by passing the stone back and forth over the depression the shoulders were ground off to a regular vertical curve of long radius.

The first of these machines was bought in 1914 and there are now five distributed over the various divisions of our line. The operator of this grinder wears eye protectors as a safety-first protection against steel and emery dust. The wheel used is 9 in. in diameter, 8 in. wide and of Grade Q corundum. The grinding bricks and wheels used on the various machines for different classes of work are standardized, six grades and shapes having been selected as the most suitable.

Practice has shown that when making surface welds the Indianapolis welder can work faster than the grinder can follow it up. In order to get the maximum efficiency out of the welder, therefore, additional grinders have been purchased recently. The Atlas grinder is shown on this page. Its field is similar to that of the Seymour grinder but the mechanical method of doing the grinding is somewhat different since the main carriage remains stationary and the grinding parts move back and forth on guides and are controlled by the wheel and lever in the hands of the operator. The main weight of the machine is on the grinding side and it is readily derailed by lowering the derailling wheels and raising the light side. The first of these machines was re-



ANOTHER TYPE OF ROTARY GRINDER AT WORK



A RAIL JOINT READY FOR WELDING



ceived last year and there are three more on order at the present time.

Up to this point particular reference has been made to general repair work with the Indianapolis welder, the great field of usefulness of which lies in its ability to do quick and satisfactory surface welding and other emergency work. In 1917 the question of securing rail with which to carry out necessary paving work became more difficult than ever, and a number of instances occurred where work was authorized to proceed but no new rail was available. It was therefore necessary to accept the situation and continue to use the existing rail by making such repairs as were necessary by welding. As the Indianapolis welders were required on regular repairs, and to take them off such maintenance work for the sake of construction would have been to take a step backward, the management approved the recommendation of the engineering department for the purchase of additional welders to take care of this reconstruction work.

New Atlantic welders made by the Lincoln Bonding Company were purchased and received in June, 1918, and immediately put to work. One of the illustrations shows the portability of this apparatus. In the picture the joint is ready for welding the plates to the rail, and the operator is about to put on his hood and commence work. This welder differs from the Indianapolis welder in construction. It consists of a mounted dynamotor, with a control over the amperage and the voltage, designed to give the best results with either the carbon or metal electrode. Less responsibility is thus thrown on the operator to secure good work. This machine can also be adapted to surface welding work. The Connecticut Company now has these welders in Bridgeport, New Haven and Hartford. The work done since the first of all this equipment was received in 1913 to the end of 1918 shows that corrugation has been removed from some fourteen miles of rail. Also approximately 55,000 joints have received some attention from the welding and grinding gangs. Since there are about 250,000 joints on the company's system the number of joints that have received attention represents about 22 per cent of the total. In addition to this a large number of repairs of all kinds have been made to special work. The reduction in the cost of making repairs to broken rails and faulty joints by welding as compared with the old methods of cutting in a new piece of rail is conservatively placed at 75 per cent. The greatest savings lie in repairs to rail joints where there is still considerable life in the rail head. Many years of life are thereby added to the track.

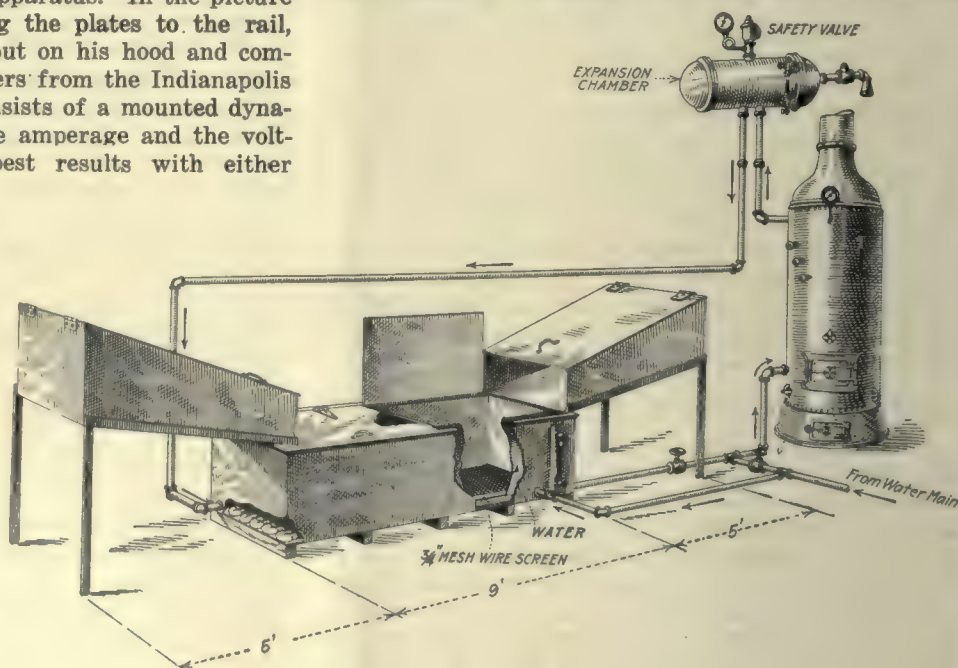
In the case of the repairs to special work the life of each piece varies so greatly that even after repairs have been made the added life is difficult to estimate. The savings effected by the use of this equipment have resulted in a reduction of operating cost of the road and a postponement in capital outlay due to the increased life of the track.

## Centralizing the Cleaning and Saturating of Waste

**Union Traction Company of Indiana Uses Original Device in These Operations and Saves 50 Per Cent in Waste and Labor**

BY INSTALLING, at its Anderson shops, equipment for washing and saturating with oil all of the waste used at its six division shops, the Union Traction Company of Indiana has made a 50 per cent saving in waste and labor used in this work. At each shop are three waste cans. Two of these are kept full of clean, saturated waste and the third is used for dirty waste removed from the cars. When the third can is full it is sent to Anderson where the waste is washed and resaturated with hot oil. Thus waste can be used three or four times before it is fit only to be discarded.

The particular feature of interest in the equipment is the saturating outfit, which is represented diagrammatically in the accompanying sketch. This was built in the local shops. It consists of a double sheet-steel tank, two draining tables and a water heater. The tank is made of two boxes, one within the other, leaving



water-jacket space between. In the bottom, between the two is a pipe radiator through which hot water from the heater, installed for the purpose, is circulated. The water in the jacket is thus heated.

The tank is divided into two equal parts by a vertical partition, one side being used for saturating new and the other for cleaning and saturating old waste. The tanks are filled with oil which is maintained at a temperature of from 90 to 100 deg. Fahr.

At each end of the tank is an inclined, covered draining table, also made of sheet steel.

M. F. Skouden, superintendent of motive power of the company, states that one man cleans and saturates all of the waste for the system, which comprises more than 450 miles of track and more than 350 cars. New waste can be saturated in two hours and all waste is allowed to drain for two hours. About every ten days the old oil is run through a filtering plant and is thus reclaimed.



# Manufacturers' Tests of Railway Motors\*

The Various Detail Parts with Materials Used in Their Manufacture  
Are Given in a Chart Which Presents an Intelligible  
Perspective of the Tests Necessary

By J. S. DEAN

Railway Engineering Department, Westinghouse Electric & Manufacturing Company

THE problem of the manufacturer of railway motors is to put on the market a piece of apparatus that has an evenly balanced electrical and mechanical design, restricted in size by definite space limitations, rigid in construction, light in weight, attractive in general appearance, competitive in price, and that will develop a specified brake-horsepower with a liberal factor of safety to meet the emergencies of railway operating conditions to which this class of apparatus is subjected in service.

Electrically railway motors must develop a specified brake-horsepower without undue heating of the windings, they must commute all working currents with

minimum sparking at brushes, and have ample insulation to prevent grounding of windings under normal operating conditions. The mechanical design, while light, must be of such proportions as to withstand the stresses set up by the high peripheral armature speed, the vibrations due to the rigid mounting on the trucks, and the shocks and hammer blows resulting from the high speed operation over all conditions of tracks, and roadbed.

In order to fulfill these requirements in the most economical and efficient manner, it is found advisable during the course of building a railway motor to make a succession of tests of the materials and detail parts that go to make up the assembled motor. It is also necessary to subject the completed motor to a series of tests to check the calculations of the designing en-

\*This is the first of a series of articles to be published in the ELECTRIC RAILWAY JOURNAL, dealing with the testing of railway motor parts and materials by manufacturers.

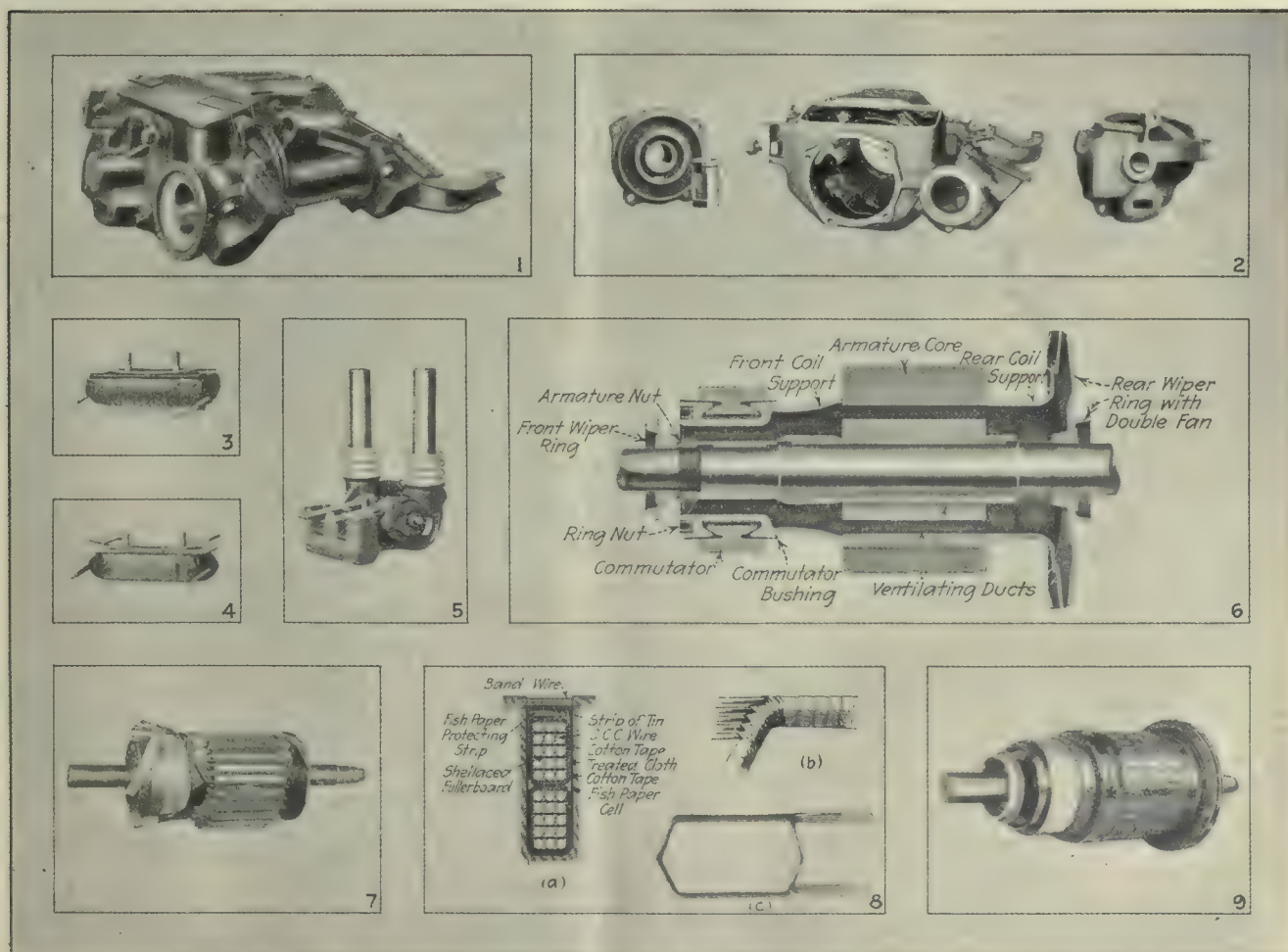


Fig. 1—A typical 50-hp., 600-volt box-frame commutating pole railway motor. Fig. 2—Motor frame complete with armature bearing housing removed. Fig. 3—Main field coil and pole. Fig. 4—Commutating coil and pole. Fig. 5—Brushholder. Fig. 6—

Cross-section showing parts as they are mounted on the armature shaft. Fig. 7—Armature partly wound. Fig. 8—Armature coils; (a) cross-section of coils; (b) taping between leads prevents short-circuits; (c) wire-wound coil. Fig. 9—Armature banding.

VARIOUS DETAIL PARTS COMPRISING A RAILWAY MOTOR



## Railway Motor Material Chart

Grouping of Motor Parts to Show Details Necessary and Materials Required in Construction

Motor	Main casting.....	Metal.....	Cast steel
	Pole pieces.....	Metal.....	Elec. sheet steel
	Coils.....	Metal.....	Hot rolled steel
			Copper wire
			Copper strap
			Cotton tape
			Treated linen
		Insulation	Fishpaper
			Asbestos paper
			Impregnating gum
			Plastic insulator
			Amber insulator
			Insulating varnish
	Coil springs.....	Metal.....	Spring steel
	Coil washers.....	Metal.....	Sheet steel
	Brush holder.....	Metal.....	Cast brass
			Sheet steel
			Spring steel
	B.H. clamps.....	Metal.....	Copper braid
			Copper strap
	Fittings.....	Insulation	Porcelain
			Micarta
	Covers.....	Metal.....	Hot rolled steel
			Copper cable
	Brushes.....	Carbons...	Rubber bushings
			Torpedo twine
	Housings.....	Metal.....	Malleable iron
			Crushed coke
	Armature bearings.....	Metal.....	Graphite
			Pitch
	Axle caps.....	Metal.....	Malleable iron
			Cast steel
	Axle bearings.....	Metal.....	Malleable iron
			Bronze
	Bolts, nuts and lock washers.....	Metal.....	Babbitt
			Steel
	Shaft.....	Metal.....	Spring steel
			Axle steel
	Core..	Metal.....	Special alloy steel
			Cast steel
	Fans.....	Metal.....	Malleable iron
			Malleable iron
	Commutator	Metal.....	Elec. sheet steel
			Sheet steel
	Bushings.....	Insulation	Forged steel
			Sheet steel
	V-rings.....	Insulation	Malleable iron
			Cast steel
	Segments.....	Insulation	Mica
			Mica
	Nut.....	Metal.....	Hard-drawn copper
			Mica
Accessories	Armature	Metal	Cast steel
			Forged steel
	Coils.....	Insulation	Copper wire
			Copper ribbon
	Keys.....	Metal.....	Copper strap
			Cotton tape
	Bands.....	Metal.....	Treated linen
			Mica tape
	Solder.....	Metal.....	Fishpaper
			Fishpaper and mica
	Insulating material.....	Insulation	Fullerboard
			Plastic insulation
	Pinion.....	Metal.....	Amber insulation
			Asphaltum varnish
	Gears.....	Metal.....	Shellac
			Forged steel
Accessories	Dust shields.....	Metal.....	Cast steel
			Roller steel
	Axle collars.....	Metal.....	Sheet steel
			Malleable iron
	Gear cases.....	Metal.....	Cast steel
			Forged steel

gineer in the case of a new motor, and to see that stock motors of a standard approved design pass the rigid inspection requirements. In some few cases the contracts of customers specify special witness tests of materials and of the completed motors, which call for additional testing facilities to comply with requirements of their specifications.

### LARGE AMOUNT OF TESTING APPARATUS IS NECESSARY

All of this work requires a large variety of expensive, complicated and delicate testing apparatus, as well as a trained force of engineers and expert workmen who are skilled in their respective lines to supervise and conduct these tests in order to eliminate all defective materials, and to insure a finished product that will measure up to all requirements as approved by the engineer of tests.

In presenting this subject for the benefit of railway men, some of the most important details will be treated under the following subdivisions:

1. Railway Motor Material Chart.
2. Metals and Alloy Testing.
3. Testing the Insulating Materials.
4. Carbon Brush Testing.
5. Tests of Detail Parts of Motors.
6. Testing the Assembled Motor.

To get an intelligent perspective of the various detail parts and corresponding materials that are required in the make-up of a railway motor, the accompanying layout of a railway motor material chart and detail photographs are given to aid in the further presentation and better understanding of this subject matter.

By reviewing the material chart, one is impressed with the great variety of metals and insulating materials that enter into the make-up of a railway motor. This fact tends to complicate the manufacturer's problem, as all materials must be covered by a purchasing department specification, setting forth the requirements they must meet before being approved and accepted by the raw material inspection department.

To facilitate the work of this department and to insure that only approved materials enter into the completed motors, well-equipped laboratories and testing departments are at their disposal for making the required tests. Some of the most important of these tests will be outlined and described later under their respective headings as given in the subdivisions previously mentioned.

### Steel Trolley Wire Being Substituted for Copper in Los Angeles

THE substitution of steel trolley wire for copper wire has just been begun by the Los Angeles Railway Company. Officials of the company state that they have been unable to obtain a sufficient supply of copper wire to care for their maintenance needs and that the price of copper wire is so high as to be practically prohibitive. They feel that steel wire is not nearly as good and as it is much heavier it requires several times as many men in its installation. Also there is no doubt that it will prove more injurious to trolley wheels than did the copper wire. Twenty-six miles of steel wire has already been received and will be installed as rapidly as possible. More of this steel wire is on the way.



# Experts Talk to Business Editors

Addresses Before New York Editorial Conference  
Indicate Maintenance of Present High Prices and  
Need for Real Co-operation of Capital With Labor

**U**NDoubtedly the three foremost questions in these days of readjustment have to do with (1) the stabilization of industry through proper understanding of and attention to post-war price tendencies and other financial problems; (2) the attainment of better co-operation between capital and labor through their mutual adherence to enlightened principles, and (3) the extension of foreign trade.

With the desire of securing for themselves and passing on to their readers the latest information on such points, the editors of the New York Business Publishers Association on April 11 held an industrial conference which was addressed by men qualified to speak authoritatively. The full remarks of the eight speakers cannot be presented here, but an effort will be made to give a sufficient summary to indicate the vital importance of their utterances.

## ENORMOUS INFLATION IN CURRENCY

The addresses on the financial aspects of reconstruction were of two sorts. One, by Francis H. Sisson, vice-president Guaranty Trust Company, New York, N. Y., was a general survey of various post-war financial problems. The others, by O. P. Austin, chief statistician National City Bank, New York, N. Y., and Irving Fisher, professor of economics, Yale University, were confined to the question of price trends and control.

Mr. Sisson expressed the conviction that this country is awakening to a realization that its prosperity depends upon increased production and that consequently foreign markets need to be expanded. The United States now holds, however, more than one-third of the world's reserve of gold coin and bullion and is already creditor to other nations to the extent of \$12,000,000,000. The remaining low stock of foreign gold cannot with safety be drained away, and anyway the "unpegging" of sterling and franc exchange has raised an invisible tariff wall, so that as long as the dollar remains at a premium this country will be a good one to sell in but a poor one to buy from. The way out of the difficulty seems to be the purchase here of foreign securities, although the government must actively protect the property rights acquired.

In regard to the steam railroad situation under government operation Mr. Sisson said:

Experience has proved that the economies effected have been negligible in comparison with the expense added; and that, on the whole, less efficient service—less satisfactory to the public and less promising for future needs—has been rendered at a largely increased cost to the shipper and the taxpayer. By July 1 more than \$500,000,000 must be provided to meet maturing railway obligations, and Congress must appropriate at least \$1,250,000,000 to maintain these essential properties.

The lack of public understanding of the factors entering into the railroad problem has been responsible for most of the difficulty of its solution. If the war has served to increase that understanding and to save the country from a more disastrous experiment in government ownership and control, the immediate expense will have been worth while. We may find, in spite of its colossal cost in service and convenience, that the experiment has been a blessing in

disguise, because it offers a most conclusive demonstration of the failure of the theory of state socialism in this country, when subjected to a practical test.

In discussing prices Mr. Austin, who is one of the foremost financial statisticians of this country and was formerly chief of the government statistical department at Washington, averred that the principal causes of price advances during the war were (1) "scarcity demand," (2) the advance in wages and (3) "inflation." Chronologically, the first cause of the advance seems to have been the "scarcity demand" for war materials, food, clothing, manufactures, manufacturing materials and the labor required for their prompt production. This was quickly followed, however, by an enormous world inflation, in which paper money with a face value of \$36,000,000,000 was emitted by the printing presses of the countries at war. The legal tender circulating medium of the world was thus advanced from \$15,000,000,000 in 1913 to more than \$45,000,000,000 in 1918, most of the gold formerly in circulation passing into the vaults of the governments and their great banks as a partial basis for this greatly enlarged paper currency.

The face value of the paper currency issued in the four years of the war was greater than the value of all the gold and all the silver mined in all the world since the discovery of America. Meantime, the national debts of the world advanced from \$40,000,000,000 in 1913 to \$220,000,000,000 in 1919 and the annual interest charge from \$1,750,000,000 to \$10,500,000,000. This quintupling of governmental promises to pay had also an important bearing upon the world finances, while the fact that bank deposits in the fifteen principal countries of the world grew from about \$25,000,000,000 in 1913 to approximately \$75,000,000,000 in 1919 still further increased the currency supply, especially in countries like the United States, in which the check plays so important a part in current business transactions.

This enormous inflation, coupled with the continued "scarcity demand" for food, manufactures, manufacturing material and the labor required for their production, was accompanied by great advances in prices first in the materials for the war. The advances gradually extended to other articles which their respective producers had to exchange for those in which the advance had already occurred, and this made the advance in prices world-wide, applying to all classes of articles irrespective of their immediate relation to the requirements of the war.

In discussing the relative weights of the three price-increase factors mentioned above, Mr. Austin made the following statements:

It appears on close analysis that the "scarcity demand" created by the war was not so great in food, clothing or manufacturing materials as has been pictured, while the fact that fifteen million men are still under arms minimizes the reduction in military demands which had been expected.

The fact that the increase in compensation of labor was



in most cases given because of the fact that the cost of living had already advanced at least somewhat minimizes the relative importance of this factor in attempting to discover the real causes of the general world-wide advance in prices. And it must also be remembered that several million persons who had not been engaged in the industrial and business world came to the assistance of those engaged in these duties during the war.

Where then shall we turn in the search for the principal cause of the general advance in prices? The most prominent among the possible or probable causes is the theory advanced or accepted by the historians, economists, statisticians and financiers of the world that inflation in currency is usually accompanied or closely followed by an advance in prices. As high an authority as a member of the present Federal Reserve Board, Professor A. C. Miller, recently declared that "the abundance of money must be credited with at least an equal influence in explaining the high prices which have prevailed."

### PRICES WILL NOT DECLINE RAPIDLY

If such are the causes of the advance in prices, what prospect is there for an early removal of any or all of the causes? Mr. Austin answered this question in part as follows:

Although the demand for war material has terminated, the other features of the "scarcity demand" will continue at least in a somewhat modified form in the immediate future, especially as relates to world requirements of food, manufacturing material and manufactures. Moreover, developments thus far do not point to an early reduction in labor costs.

That part of the price advance caused by inflation can only be cured by deflation, by a reduction in the enormous stocks of currency which has trebled during the war while that other form of slowly moving currency, governmental obligations, has quintupled. Is it probable that these two forms of currency can be or at least will be reduced in the near future?

Present indications are that the governments of the world will be compelled to collect in taxes about \$1,000,000,000 a week as compared to \$1,000,000,000 a month before the war, and this does not include anything for "sinking funds" or other provision for reduction of outstanding debts. If this be true, is it probable that the governments in those countries which have greatly increased their circulation and must now demand such enormous increases in annual payment of taxes will find it advisable or possible to reduce materially the amounts of currency available for such payments?

If the governments which have been the chief participants in the world increase of currency should fail to reduce materially that excessive supply, and if the world's demand for food, manufacturing material and manufactures is to continue at the present rate, are we justified in expecting a general reduction in prices in the near future? The question answers itself. There will, of course, be instances in which there will be material reductions, but in general terms the outlook for marked or rapid decline, at least in the near future, does not seem encouraging.

### STABILIZING THE DOLLAR

Professor Fisher outlined his plan to substitute a "goods-dollar" for the gold dollar as the standard of value. This proposal finds its justification in the fact that great price fluctuations are chiefly due to money conditions. Since a descending value of gold cannot lower the price of gold it must raise the prices of other things in terms of gold; and since an ascending value of gold cannot raise the price of gold, it lowers the prices of other things in terms of gold. The fluctuating prices produce industrial instability, financial crises and social injustice.

Professor Fisher's plan, in general, may be summarized in the following way:

- (1) To abolish gold coins and convert the present gold certificates into "gold-dollar certificates" entitling the holder to dollars of gold bullion of such weight as may be officially declared from time to time.
- (2) To retain the virtual "free coinage"—that is, de-

posit—of gold and the free redemption of gold-dollar certificates.

(3) To designate an ideal composite goods-dollar consisting of a representative assortment of commodities, worth a dollar at the outset, and to establish an index number for recording, at stated intervals, the market price of this composite dollar in terms of the gold dollar.

(4) To adjust the weight of the gold-bullion dollar at stated intervals, each adjustment to be proportioned to the recorded deviation of the index number from par.

(5) To impose a small "brassage" fee not to exceed any one change in the gold dollar's weight.

The crux of the plan lies in the rule by which the index number regulates the dollar's weight. Its significance is, that to keep the gold dollar from shrinking in value the weight is increased, it being thus recognized that a depreciated dollar is a short-weight dollar. Reversely, to keep the dollar from growing in value the weight is shrunk, for an appreciated dollar is an over-weight dollar.

The plan outlined has received the approval of a large number of economists and business men of influence, including President Hadley, Yale University; a committee of economists appointed to consider the purchasing power of money in relation to the war (consisting of Royal Meeker, United States Commissioner of Labor Statistics; Prof. Wesley Clair Mitchell, Columbia University; Prof. E. W. Kemmerer, Princeton University; Prof. Warren M. Persons, Colorado College; Prof. B. M. Anderson, Jr., Harvard University); Frank A. Vanderbilt, president National City Bank, New York; George Foster Peabody, New York; John Perrin, federal reserve agent, San Francisco; Henry L. Higginson, Boston; Roger W. Babson, statistician; John Hays Hammond, mining engineer; John V. Farwell, Chicago; United States Senator Robert L. Owen; the late Senator Newlands; and Sir David Barbour, one of the originators of the Indian gold exchange standard.

### WHAT INDUSTRIAL CO-OPERATION MEANS

The capital-labor phase of readjustment was discussed by Charles P. Steinmetz, consulting engineer General Electric Company; John Calder, formerly general manager Remington Typewriter Company and during the war active head of important manufacturing work for the government; V. Everit Macy, president National Civic Federation and appointee of President Wilson as chairman of committee on adjusting wages in private shipbuilding plants; and Dr. Charles A. Eaton, who recently resigned his Fifth Avenue pastorate in New York City to devote himself to problems of industrial reconstruction.

According to Mr. Steinmetz, the interests of capital and labor are the same in some respects but the opposite in others. In general, in any industry, those interests which have to do with industry on the outside, customers, etc., are identical. Within the industry concerned the interests of employer and employees are often opposite to each other.

The initiative in adjusting differences should lie with the employer. Co-operation of capital and labor should be the aim, but this implies two parties working together, not one settling the matter and telling the other "you must do this and that and then we will co-operate." Unfortunately, Mr. Steinmetz said, most of the serious efforts made in this direction have been of this character—the employer has worked out plans and then asked the employees to co-operate on those plans. Very often those plans have been good, and the whole scheme



would have been satisfactory if it could have been worked out jointly.

Mr. Steinmetz criticized welfare work which is based on paternalism. As for the bonus system, this has the disadvantage of giving a share in the profit but not in management. The English shop committee system presents the difficulty that labor unions may look upon the institution of such committees as a move to eliminate the unions. A better way to secure co-operation is through the wage dividend, which Mr. Steinmetz described as follows:

Capital is entitled to a fair rate of interest on the money invested, and labor is entitled to a fair rate of wages for the work done. All profits beyond that belong to capital and labor. These should be divided into dividends on capital stock and the balance into dividends on labor stock as determined by yearly wages. This system is in operation in a number of corporations, in electric utilities companies and others.

It lacks provision for share in the management. We could carry it further and recognize labor as equivalent to capital and give the labor stockholder the same right as the capital stockholder in the management. This does not set up rival administration, but brings about joint control by evolution and not by revolution.

How far should employees be recognized as stockholders? There are many things that show that only those who have been with the organization for a number of years should be recognized as wage stockholders. We could set the limit at ten years. The labor stockholders would not be many and would not make any radical change in industry, and every year or so we could change the minimum, going down to six or five years. This would eliminate any opposition except from the extreme socialists who refuse to recognize capital at all.

#### RAISING SUPERVISORY STANDARDS

Mr. Calder expressed the conviction that only through enlightened and energized employers and their foremen in industry will a permanent advance be made. Individual organizations sincerely aiming at democracy in their industrial relations must insure that their foremen are instructed and willing co-operators, and the particular technical competence for which they were originally selected is no guarantee of this. The standard of executive intelligence and sympathy must be raised.

On the subject of "Organization in the Settlement of Industrial Disputes," Mr. Macy said in part:

It is of the utmost importance for the peaceful and productive development of industry that both employers and employees should be thoroughly organized in order that trade agreements may be worked out between them. Before this can be successfully accomplished, however, employers must place in the hands of broad-minded, experienced men the responsibility of formulating and carrying out their labor policies. Such men might be called labor advisers, administrators, or engineers.

A group of such men representing the manufacturers of an industry should meet with the international presidents of the unions employed and in conference reach an agreement covering the questions of wages and hours for the entire industry or for districts. Local boards, on which the employers and the employees should have equal representation, should then be set up for the purpose of establishing local, or district, working conditions and of interpreting the detailed application of the wage scale to individual plants.

I wish especially to emphasize the fact that the establishment of such committees must in no way be taken as an alternative or as a counter weapon against agreements with the regularly constituted trade unions, for no plant committee can make agreements covering competing firms, nor do they have the responsibility of an organization behind them. Above all, they cannot have the advantage of being guided and controlled by men of national experience.

Dr. Eaton declared that the principles of representation in industry, if properly applied, will make a new

era in industrial relations. This does not mean that the workers are to manage industry, but the management will no longer represent only capital. It will represent labor as well. Dr. Eaton sees a marked willingness on the part of employers to consider plans for eliminating autocracy in their business.

The subject of foreign trade problems was covered by G. A. O'Reilly, foreign trade expert Irving National Bank, New York, N. Y. He stated that the tendency of manufacturers and salesmen to force their views and wares upon foreign buyers had fortunately been largely checked, and the American view had been broadened. He emphasized the fact, however, that remaining problems need to be solved without delay.

## Causes and Prevention of Corrosion of Pipe Carrying Hot Water

By a Process of "Deactivation" Even Water Which Has Considerable Acidity May Be Rendered Nearly Non-Corrosive

A STUDY of the causes of corrosion of pipe carrying hot water led to the development of the Speller system of "deactivating" water by the removal of oxygen. This was mentioned briefly in the issue of this paper for March 8, page 454. Essentially this system, in which the National Tube Company is interested, consists in bringing the water under pressure in contact with large iron surfaces on which the corroding action takes place and the corroding ability of the water is virtually destroyed.

The company has reprinted a paper read before the American Society of Heating and Ventilating Engineers last year, which gives details of the process and also explains in simple language the chemistry involved. The authors show that any water may be distinguished by the terms "active" and "inactive," the quality of activity being dependent upon certain substances which modify the universal tendency of even the purest water to initiate the corrosion process. The inherent tendency of pure water to attack metal may be greatly aided when gases are dissolved in it. An inactive water is one that does not appreciably corrode iron. It has been demonstrated that an inactive water after a few minutes aëration becomes capable of doing great damage to iron.

Every metal when placed in water is subjected to a certain fixed tendency to go in the solution, and the initial reaction in corrosion is analogous to solution in acids. Water exists in the liquid state not only in the form of its molecule but also as ions, which are formed by the breaking up of the molecule. These are called the hydrogen and the hydroxyl ions. The concentration of the former in the water determines its ability to attack iron. The ability of acids to attack iron is due to their greater tendency to ionize.

While the tendency of iron to corrode depends to a certain degree upon the amount of acids present in the surrounding water, corrosion may be arrested even in distinctly acid water by deactivation. Experiments with this process of deactivation have been carried on now for several years and the process has proved to be quite effective. The development of the process illustrates the value of theory in its application to practical problems.





PLANTING SCHEME FOR GROUNDS AROUND DOCK STREET SUBSTATION, SCHENECTADY (N. Y.) RAILWAY

## Planting the Grounds Around the Shop or Substation

**A Commendable Practice, Carried Out at Small Cost, Illustrated from the Experience of the Schenectady (N. Y.) Railway**

THE Dock Street substation of the Schenectady Railway is not situated in the most beautiful part of the city, but F. Palmatier, superintendent of power, has made its grounds very attractive by the use of a simple planting scheme. The sketch reproduced shows the idea which Mr. Palmatier had in view and the photographs indicate how he was able to carry out his idea at very small expense. The photographs were taken after the foliage had begun to fall, but sufficient remained to indicate the extent to which it had been possible to carry out the plan in 1918.

For the back hedge 100 American arbor vitæ plants were set 24 in. apart. These cost 14 cents each. The front hedge was of Japanese barberry planted 14 in. apart. Four hundred plants were required at a cost of 9 cents each. In the hedges, at intervals of 25 ft. Catalpa Bungeii trees, grafted on 6-ft. stems were placed. They cost \$1.25 each.

Along the long side of the building are hardy hydrangeas, 4 ft. apart, with salvia between. The hydrangeas cost 12 cents each. At the front entrance forty roses, costing 25 cents each, were placed on 2-ft. spacing, and blue spruce trees (Kosteriana), costing \$5 each, were planted in the lawn. Around the whole

plot are small beds, 3 ft. x 7 ft., thirty-six in number, which are now planted with 100 tulips each for early spring bloom. The total cost of these was \$36. The center bed, on the entrance side, contains 600 Darwin tulips, for early spring bloom, and it cost \$12. This bed is 12 ft. in diameter.

After the tulips cease blooming the bulbs will be lifted and brought indoors for curing. The center bed will then be filled with cannas, placed 12 in. apart, with a row of salvia similarly spaced. This bed will be set off with a row of dusty miller. The small beds will contain annuals, such as asters, sweet peas, etc., with one peony bush in each bed.

The first planting of the Dock Street substation ground cost about \$155. As hot beds are maintained behind the station the cost of the small annual plants will be only that of the seeds. All labor is furnished by the regular power department force.

## Safety Cars Satisfactory in Mansfield

H. A. Cowgill, superintendent Mansfield Public Service & Utility Company, Mansfield, Ohio, states that the safety cars operated by this company have given great satisfaction to all parties concerned. There is a growing desire on the part of the trainmen to operate the new cars, not only on account of the slightly greater wage rate but because the men find themselves less tired at night than they did when operating the larger cars. Several men entitled by seniority to day runs prefer night runs on safety cars.



APPEARANCE OF THE DOCK STREET SUBSTATION GROUNDS LAST FALL



# Some Mysterious Car Ailments

**Little but Important Troubles That Tend to  
Keep Equipment Men Interested  
in Their Work**

CONTRIBUTIONS ARE INVITED FROM THE FIELD



## A Commutator of an Interpole Motor That Insisted on Developing Flat Spots

A FEW DAYS after the motors on a car operating in city service in the Middle West had been overhauled the commutator of one of the motors developed a bad flat spot. The armature of this motor had been changed when the motor was overhauled and a newly-rewound armature had been installed. The flat spot was removed by turning the commutator down and the armature was again put back into the motor and the car was returned to service. After two weeks' time the car again came into the shop with a bad flat spot which covered from five to six bars of the commutator. As it seemed probable that a mistake had been made in winding the armature this was removed and the original armature was reinstalled in its place. The connections and throw of the leads for the newly-rewound armature were checked over carefully but no trouble was found. After another two weeks' service of the car the original armature came back with a very bad flat commutator. The commutation of the motor was watched while it was in service and this appeared to be sparkless but in starting there appeared to be a heavy drag so that the motor would start hard with a heavy pull on the line. It was then decided that there must be a defect in the field or in the connections to them, although both the shop foreman and master mechanic were certain that the fields had been reconnected as they were before overhauling. However, the polarity of the field coils was tested and it was found that one of the interpole fields was reversed. The coil was changed to give the desired polarity and the car again returned to service. No further trouble was experienced with flat spots so it was evident that the remedy was effective.

## How a Balky Car Was Cured

A HIGH-SPEED interurban car operating on a railway line in the Central Western States was reported for irregular action of the control equipment. This car was equipped with automatic battery type control and a 14-volt storage battery was used to supply the operating current. The trouble as reported was that sometimes the control equipment would notch up only to the second series resistance point, while at other times the equipment would operate satisfactorily. A representative of the control manufacturer inspected

the equipment for a possible defect. At that time, however, the control equipment was working satisfactorily, and nothing unusual was found. The equipment continued to operate properly for nearly a month after this inspection. Then it went back to its old tricks. The master mechanic of the road took the case under his special supervision and rode on the car for two days in service before anything unusual occurred. He decided that there must be a loose connection somewhere and accordingly had the car shopped for detailed investigation. A careful inspection was made of all terminals and connections, but all appeared to be tight. He was just getting ready to have the car rewired as a last resort when his attention was called to a connection which was tapped onto the lead running to No. 2 line switch. He removed the tape from the connection and found it loose, so that it could be moved back and forth on the wire from which the insulation was removed. By operating the control equipment with this connection removed, it was found that it would notch up only to the second point, while with the wire connected firmly to the exposed wire the control equipment would notch up to its proper position. The wires were cleaned carefully and again resoldered and the trouble of the erratic action was overcome.

## Exceptional Causes for Hot Armature Bearings

HOT armature bearings, aside from the annoyance they cause, are the most costly of all equipment troubles, since they usually result in excessive damage to the armatures through rubbing the pole faces. One large railway experienced a large amount of trouble from this source on some new motors which had just been placed in service. Engineers from the manufacturer and railway company at first thought that the trouble might be caused by improper packing of the bearings or the use of inferior waste. Accordingly, all bearings were repacked carefully by an experienced man and the highest grade of waste only was used, but the trouble still continued.

In checking some of the new bearings for clearance before they were placed in service it was discovered that the bearings were not round. The bearings were intended to be 0.006 in. larger than the shaft. When measured across one axis proper clearance was found



but when measured on an axis at right angles to this there was no clearance at all. It was also discovered that the bore of the bearings was not true with the housing fit, so that there was a tendency for the bearings to bind on the shaft. The diameter of the bearings at the two ends was also not the same. These inaccuracies and imperfect machining had resulted from the jigs in which the bearings were machined, allowing the bearings to spring out of shape somewhat due to the strain of machining. All bearings were accordingly removed from the motors and carefully rebored and the trouble from hot armature bearings entirely disappeared.

### Use As Incubators Does Not Improve Air Brake Equipment

A VERY uncommon freak accident occurred on an electric railway which puzzled the mechanical department for some time. A motorman operating one of the cars had a collision which was very serious and did considerable damage. He insisted that at the time of the accident he was operating his car very carefully and that he had applied the brake in sufficient time to have enabled him to make the desired stop without accident, but that the brakes apparently did not operate properly. The air brakes on the car were subjected to a very careful inspection; the piston travel was measured, all adjustments carefully tested, and everything was found in satisfactory condition. The car was returned to service and continued to operate satisfactorily for several weeks, when again it had an accident similar to the one just described. It was then decided that all air-brake apparatus on the car should be dismantled in an endeavor to locate the cause for the trouble. Accordingly, the entire air-brake apparatus was removed from the car and taken apart.

In one of the passages of the triple valve there was found a collection of eggs which had been deposited there by an insect and were developing. As they spread out and grew larger, the air passing through the passage blew them into one of the ports of the triple valve. This became choked and caused the slow application of the brakes. The action of releasing the brakes, or of another application cleared the obstruction so that the equipment operated properly. Operation continued to be satisfactory until additional eggs were developed so as again to choke the port of the triple valve and prevent the passage of air.

### Motormen Are Not Always to Blame for Rough Operation

THE jerks and inconvenience to passengers from the sudden starting or stopping of cars are most commonly blamed on the motorman by the traveling public. Some of these are caused by faulty condition of the equipment as appears from the following experiences:

On returning to the terminal with his car a motorman reported that he could not get any braking effect from a service application of the brakes and had continually to move his brake handle into emergency position to stop the car. This resulted in exceedingly rough operation and caused severe criticism from the passengers. The trouble was eventually located in the

motorman's brake valve and on removing this from the car and taking it apart a small piece of rubber from a gasket was found stopping up a port on the seat of the valve. This piece had been pinched off the gasket by careless assembling of the valve and was the cause of the trouble.

Another case of air-brake failure caused in a similar manner as the preceding was due to the air-brake inspector, in assembling a hose, allowing the end of the hose connection to cut the inner lining so that this in turn completely closed the end. Owing to its unusual character, the location of this defect baffled the inspectors for a considerable time.

Considerable trouble was experienced on a large railway property with stiff, or hard-working, brake valves. But a short time would elapse after they were lubricated before they would be reported again for being stiff. Tests of various lubricants were made but it was not until one of the workmen suggested olive oil that the desired results were obtained. This might be considered as an expensive lubricant to use but with the small amount of oil required and the freedom from troubles, the results easily justified its use.

### Why Manufacturer's Test-Stand Results Did Not Apply on the Line

AN ELECTRIC railway that was just placing some newly equipped cars in service experienced considerable trouble due to the motors flashing over. These motors were of a late interpole type with tapped-field control and the flashing occurred during the operation of the tapped-field position. The manufacturer's engineers were severely puzzled to account for the trouble as the motors had showed exceptional overload capacity on test at the manufacturer's plant. The operation of the equipment in service was watched carefully and tests were made to determine the maximum temperature rise of the motors while in service. All appeared normal and the temperature rise was not excessive.

Meters were then installed in some of the principal circuits and readings of current and voltage were taken during operation. These readings showed that there was an abnormal current swing in passing from the full-field to the tapped-field position of the control. The resistance of the two parts of the fields was then taken and it was found that instead of cutting out 40 per cent and leaving 60 per cent in circuit on the tapped-field position as was intended, 60 per cent was being cut out. A mistake had been made in the permanent wiring of the switch group at the manufacturer's plant. All connections had been made according to the wiring diagram but this did not indicate which were the large and which the small portions of the fields. The trouble was corrected by interchanging the two outside leads to the motor fields. The motor leads were disconnected from the car wiring and were pulled back through the motor bushings to the inside of the motors. After interchanging the two outside field leads they were again pulled back and reconnected to the leads running to the switch group. This produced a change in the direction of rotation of the motors so that the car moved in the opposite direction from that indicated by the master controller and to correct this the leads from the master controller to the reverser were exchanged. After the necessary changes had been made the equipments operated satisfactorily.



## Handling Cars with Broken Axles

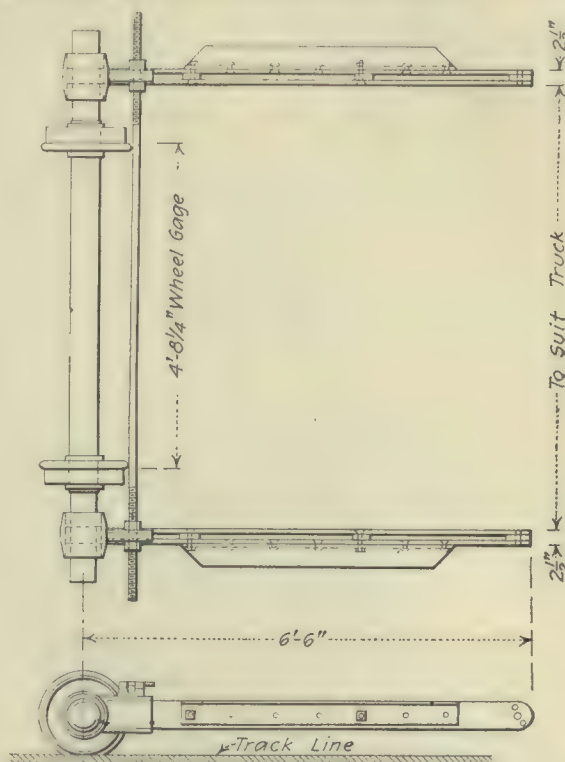
**Detroit United Railway Has a Pony Truck That Does the Work of an Auto Wrecking Car Always Ready for an Emergency Call**

**B**ROKEN axles are something which, as the saying goes, "happen in the best of regulated families" or in this case, on the best electric railway systems. For years studies have been made of this subject but the problem still remains to build an axle of efficient weight that is positively immune against breakage. Careful watching and periodical tests make it possible to remove from service the greater number of imperfect axles before an actual breakage occurs, but as it is sometimes impossible to detect the weakness which later results in an emergency call for assistance or a "pull in," most railways find it advisable to provide themselves with some form of equipment to be used when the necessity arises.

The Detroit United Railway has developed a pony truck which will fit any type of electric car truck, without the use of any bolts for fastening it, and which enables a car with a broken axle to proceed to the shops under its own power with a minimum of delay to traffic.

The first device developed was a skid, but this has now been replaced by the pony truck outfit shown in the accompanying figures. Each side arm is made up of two plates separated by a filler plate, riveted in place. A chain hook slips between these plates at the free end of the side arms and a chain passing over the car truck and fastened on either side by the chain hooks supports the arms. To the opposite end of the side arms are riveted heavy journal castings, 8 in. in length, and having inserted from each end brass bushings  $2\frac{1}{2}$  in. long, which leaves a 3-in. oil well between the bushings. This oil well is packed with oily waste to insure perfect lubrication. The journals of a 5-in. axle, fitted with 14-in. pony wheels, fit into these journal boxes. To eliminate some weight and provide a simple means of handling this truck, the axle is bored hollow  $2\frac{1}{4}$  in. in diameter and to a depth of

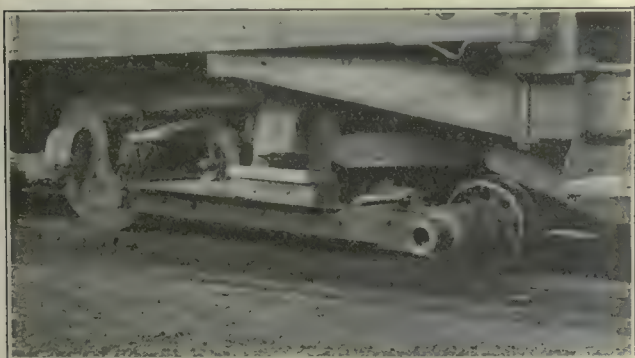
minutes for two men. The spacing rod is first removed. The side arms are then taken off by releasing one tail nut on each. The short bar is used on each end of the pony axle to lift it, and place it in position either behind or ahead of the damaged car truck. The car truck is jacked up, the side arms adjusted with chains



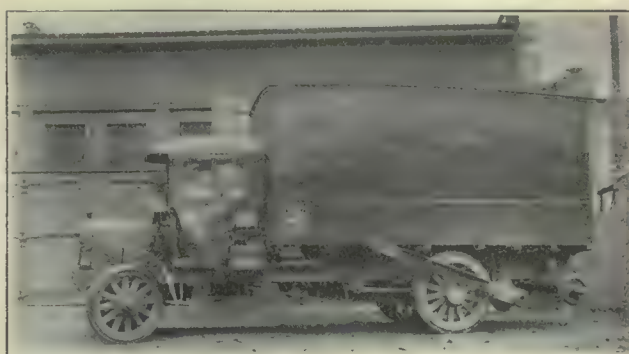
ASSEMBLY DESIGN OF PONY TRUCK FOR BROKEN AXLES

and wooden blocks, the spacing rod is snapped in place, the jacks are removed, and the car is taken under its own power to the shops.

Before this device was developed, a trolley wrecking car had to be called, and the damaged car was pulled to the nearest wye. Here the car was jacked up and



METHOD OF ADJUSTING PONY TRUCK TO CAR TRUCK WITH A BROKEN AXLE



DETROIT AUTOMOBILE WRECKING CAR WITH PONY TRUCK ATTACHED

15 in. To keep the side arms at proper distance a spacing rod is set in a socket just behind the pony wheels.

This pony truck outfit is carried assembled on the automobile wrecking cars for the city lines, and on the interurban lines the outfit is carried on the motor cars of work trains.

The operation of placing the pony truck in position under the car truck is simple and takes about five

a new truck put under it. This meant a considerable delay to traffic and consumed a great deal of time. Aside from the saving in traffic tie-up, it is estimated there is a saving of at least \$20 per car in labor cost for each emergency case of this kind.

Not the least important feature in dealing with such emergencies is the wrecking equipment. A trolley wrecking car is subject to much delay in arriving at the scene of trouble, having to make a greater mileage



and having to come to a stop perhaps 1000 ft. or more from the wreck, because of the line up of cars between it and the wreck. This then makes it necessary to drag the pony wheels and wrecking apparatus this additional distance by hand.

For this purpose the Detroit United Railway has an automobile wrecking car, the body of which was built in the railway company's shops and placed on a 5-ton Packard chassis. The chassis cost \$4,500, the body \$350, and the wrecking equipment and tools with which it is furnished cost \$1,350. The equipment consists of one set of pony trucks for carrying broken axles, three each of three types of jacks, four sets of replacing frogs, two sets of block and tackle, 500 ft. of 1½-in. rope, and 500 ft. of 1-in. rope, wound on two reels suspended at the front of the body, together with the usual complement of small equipment, such as lanterns, crowbars, splice bars, chains, picks, shovels, rubber coats and boots and carbic hand lights. This same equipment is also carried on motor cars of work trains on interurban lines.

The company has three automobile wrecking outfits, two of which are lighter than the one described. These cars are used for all kinds of emergencies. For the car described there are two competent wrecking men always on duty. There are two shifts of twelve hours each, so the truck is available for service on a moment's notice.

The cost of the pony truck outfit is approximately \$200, and a patent on it has been applied for.

## Is the Core of Stranded Wire Disproportionately Stressed?

Actual Stretch of Outside Wires Is Greater but Due to Their Increased Length the Per Cent Stretch Is the Same

BY PAUL A. B. SAHM

Associate Electrical Engineer United States Bureau of Standards

**I**N AN article entitled "Details of Line Construction with Special Reference to Guying and Anchors" by Charles R. Harte, on page 868 of the *ELECTRIC RAILWAY JOURNAL* for Nov. 16, 1918, the assumption is made that the center wire of a seven-wire strand takes all the load at first and breaks long before the others, and that it should, therefore, not be counted in determining the strength of the entire strand. The following is given in the hope that it will clear up a misunderstanding seemingly quite common among engineers regarding the behavior of stranded wires in tension.

The above assumption is not warranted even if the strand is loosely wrapped. If it is closely wrapped from the start so that the ratio of length of outside to inside wire remains constant, all wires will take their proper portion of the load.

Because it is difficult for the manufacturer to make up a long strand without a splice in any one wire, most specifications for guy strand require that not more than one wire be spliced in a given length of wire. This splice does not, of course, develop the full strength of the wire, and in order to "play safe" some companies specify that the guy strand with one wire broken shall meet the desired rating. This, however, is no reason for "picking on" the center wire.

Assume a seven-wire strand of 100 in. length clamped so that the wires cannot change their relative positions

at the clamps and stretch the entire strand 1 per cent. Assume the outside wires wrapped close and 1 per cent longer than the inside wire (0.97 per cent listed by American Steel & Wire Company).

Let  $L_{si}$  = stretched length of inside wire.

$L_{so}$  = stretched length of outside wire.

$L_{oi}$  = original length of inside wire.

$L_{oo}$  = original length of outside wire.

Then the stretch of the inside wire is

$$L_{si} - L_{oi} = 101 - 100 = 1 \text{ in.} = 1 \text{ per cent.}$$

The stretch of each outside wire is

$$\begin{aligned} L_{so} - L_{oo} &= 101 \times 1.01 - 100 \times 1.01 \\ &= 102.01 - 101 = 1.01 \text{ in., } \frac{1.01}{101} = \\ &= 1 \text{ per cent of its original length.} \end{aligned}$$

It is seen that although the actual stretch is greater for the outside wires the per cent stretch is the same for all wires when wrapped close, and it is also evident that this will hold for any amount of stretch. If the wires will all stand the same total per cent of elongation they must all be equally near the breaking point and will break at the same time, even if of different diameters.

Assume now a similar strand with outside wires wrapped loosely and 1.2 per cent longer than the inside wire when slack and 1 per cent longer when under tension. Stretching the strand 1 per cent will give a stretch of the inside wire of 1 per cent (evidently) and a stretch of the outside wires of

$$\begin{aligned} &= 102.01 - 101.2 = 0.81 \text{ in.} \\ L_{so} - L_{oo} &= 101 \times 1.05 - 100 \times 1.012 \\ &= \frac{0.81}{101.2} = 0.8 \text{ per cent of its original length.} \end{aligned}$$

Up to this point the inside wire has stretched 25 per cent more than the outside wires and is, therefore, nearer the breaking point, but this condition changes as the strand is stretched further as may be seen from the following:

Stretching the strand 5 per cent will give a stretch of the inside wire of 5 per cent (evidently) and a stretch of the outside wires of

$$\begin{aligned} L_{so} - L_{oo} &= 101 \times 1.05 = 100 \times 1.012 \\ &= 106.05 - 101.2 = 4.85 \text{ in.} \\ &= \frac{4.85}{101.2} = 4.8 \text{ per cent of its original length.} \end{aligned}$$

At this point the inside wire has stretched only 4.2 per cent more than the outside wires as compared with 25 per cent in the previous case.

The permissible ultimate elongation of the component wires of the strand will vary over a much wider range than this so that there is no reason for expecting the center or any other wire to break sooner than the others and the center wire will carry only its proportion of the total load.

The above is for practical conditions and shows that even for loose strands the inside wire is only very slightly ahead of the outside wires as regards breaking and its strength certainly cannot be neglected. When testing stranded wire to the breaking point all wires are found to break at the same instant every time and this is also found in the field, except, of course, when the wires are corroded to different extents or are not solidly attached at the ends.



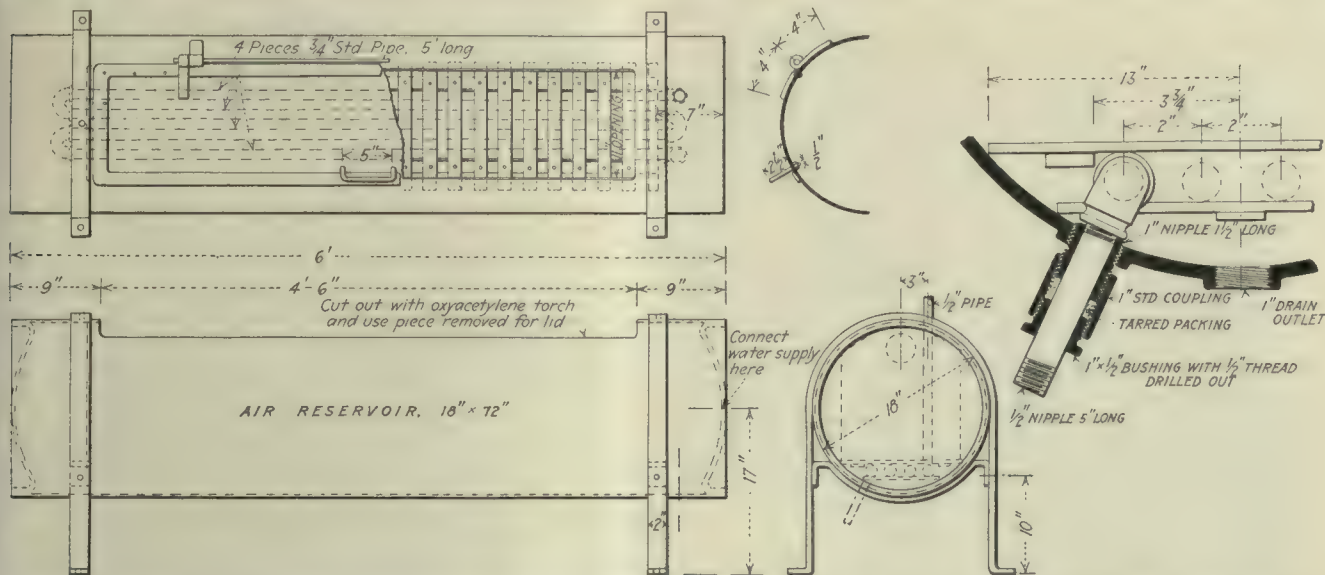


FIG. 1—DETAILS OF CONSTRUCTION OF PINION HEATING TANK USED IN SHOPS OF UNITED RAILWAYS COMPANY

Pinion Heating in Shops and Carhouses

United Railways of St. Louis Builds Simple Equipment for Heating All Pinions Before Installation

WHEN pinions were made of softer materials there did not seem to be the same need for heating them before placing them on the motor axles as now exists with the harder heat-treated pinions. This has been the experience at the shops of the United Railways of St. Louis, where it has been found that the present grade of pinion when placed cold on the axle will often work loose.

All pinions are now heated by this company before being placed on the axles. To accomplish this the equipment, shown in Figs. 1 and 2, has been installed in the main shop. This heater was formerly an 18-in. x 72-in. high-pressure air storage tank. A section 11 in. x 54 in. has been cut out of one side with an oxy-acetylene torch and this, furnished with hinges, a handle and overlapping strips, forms a door in the top of the tank.

A steam coil lies in the bottom of the tank under a wire grating and is connected to a main steam line with a pressure of 150 lb. A gage, a  $\frac{1}{2}$ -in. safety valve and a check valve are also provided. The tank is further equipped with a cold water inlet and a drain and steam trap, and is mounted as shown in Figs. 1 and 2.

There is a space of 12 in. above the grating for the water, which is heated to a temperature of 212 deg. Fahr. In this water pinions enough for the day's work are placed each morning and removed as needed by means of the hooks seen behind the tank in Fig. 2.

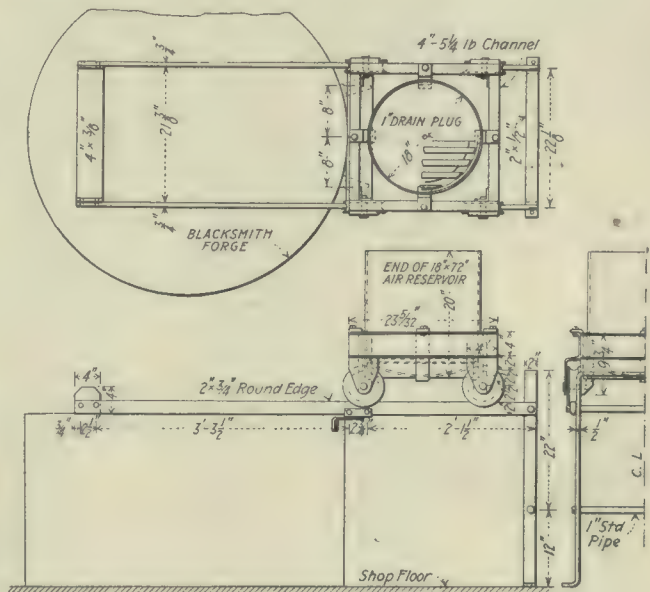


FIG. 3—DETAILS OF PINION HEATING TANK USED IN CAR HOUSES OF SAME COMPANY

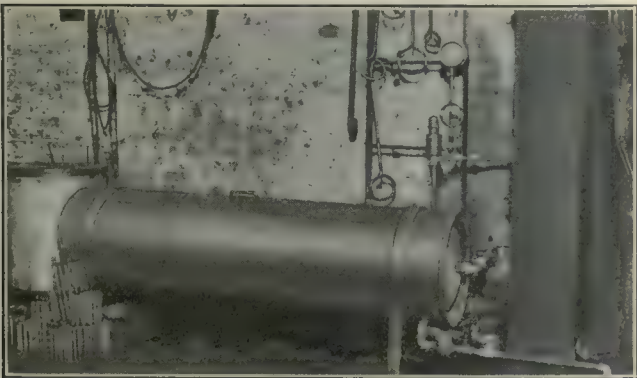


FIG. 2—PINION HEATING TANK DETAILED IN FIG. 1

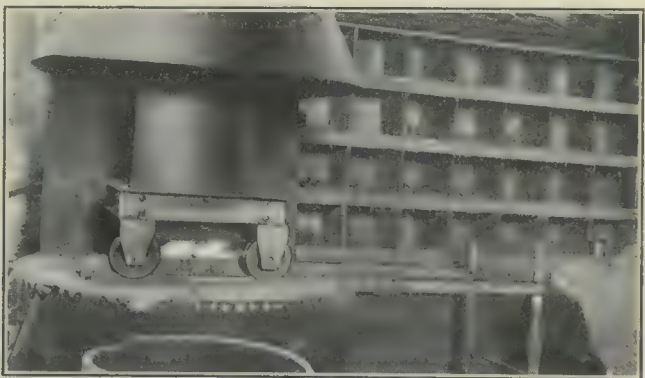


FIG. 4—PINION HEATING TANK OVER FORGE

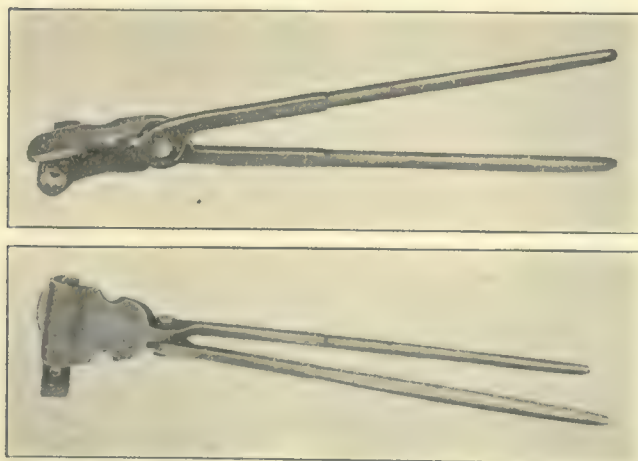


A considerable amount of pinion changing is done at the outlying carhouses and as these in the summer are not provided with steam some other method of heating the pinions was essential. All of the carhouses are equipped with tools for making minor repairs and with a blacksmith shop so the heating equipment shown in detail in Fig. 3 and by photograph in Fig. 4, was arranged to heat the pinions over the forge.

This equipment, of which seven outfits are being built, consists of 20 in. cut from the end of an 18-in. x 72-in. air storage tank by means of an oxy-acetylene torch and mounted open end up on a truck built as shown in Fig. 3. This little pinion heating car, as it might be called, operates on a short track attached to the forge so that when the latter is needed for other purposes the car can be pushed to one side for a few moments. Pinions sufficient for the day's needs are placed in the tank each morning and removed as needed.

### Unique Soldering Tongs Save Much Time in Soldering Connectors to Motor Leads

THE use of a knuckle-joint or screw-type connector to connect the motor leads to the car-body leads of electric cars is universal practice. These connectors are usually provided with a saw cut along the side. In order to solder these connectors to the leads they are filled with solder and the lead is inserted. To prevent the solder from running out the usual method is to wrap the connectors with friction tape and leave this in place during soldering and then remove it again after the soldering has been completed. To do away with the necessity for taping up these connectors the soldering tongs shown in the accompanying illustration have been devised by Fred Koebrich, foreman of the East New York surface shop of the Brooklyn Rapid Transit Company. These tongs are provided with a long jaw on one side which fits the connector very closely and provides a tight joint along the saw



TONGS FOR SOLDERING CONNECTORS TO MOTOR LEADS

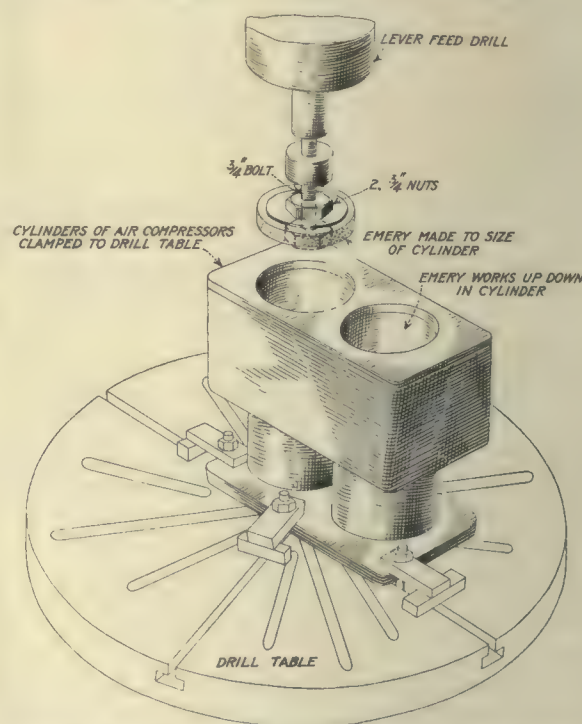
cut where the solder usually runs out. By using these tongs the terminal can be quickly inserted and the soldering completed without applying tape to the terminal. The handles of the tongs are made exceptionally long in order that there may be no danger of their becoming hot while soldering. Where connectors have become burned or have a rough surface a layer of friction tape laid inside the tongs will fit over the rough places and provide a tight joint.

## Satisfactory Method of Finishing Welded Air Compressor Cylinders

BY J. D. PRIDE

Master Mechanic Nova Scotia Tramways & Power Company, Ltd., Halifax, N. S.

DURING the cold weather of the past winter we had the misfortune of having our Gardner Rix motor-driven air compressor cylinders cracked by frost. This compressor was used at our quarries for furnishing the air necessary in drilling rock. The cracks were in the cylinder proper and did not extend to the outside of the water jackets. Owing to the design of the



ARRANGEMENT FOR FINISHING AND SMOOTHING WELDED AIR COMPRESSOR CYLINDERS

cylinder it was impossible to weld from the outside, so this work had to be done with the acetylene process on the inside. After the welding operations were finished, we gave the cylinder a gas test by plugging all openings, and by connecting the water inlet of the water jacket to a gas jet by means of a rubber tube. A lighted candle was then passed over the welds, which proved their tightness.

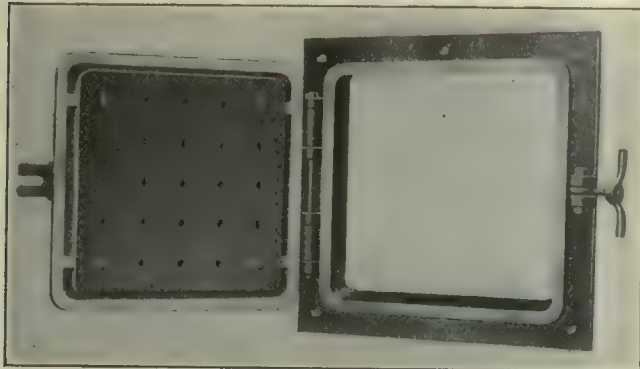
The machining and smoothing off of the rough surface left by the welds inside the cylinders, without changing or losing the piston size, proved a greater problem than we had anticipated. We first tried to machine the cylinders by using a drill press with a boring bar, but owing to hard spots in the weld and the high speed at which it was necessary to operate, this method proved unsatisfactory. We then secured an old emery wheel and ground and dressed it down to the exact size of the cylinder bore. A mandrel for the emery wheel was made out of a  $\frac{3}{4}$ -in. bolt. By putting this through the hole in the wheel, and by screwing a nut on either side to hold it in place, the compressor cylinder was clamped to the table of the drill press and by means of the hand-speed spindle the emery wheel was worked up and down over the rough spots till they were smooth, and the cylinders were in as good condition as when received from the factory.



### New Type Airtight Ash-pit Door

THE American Steam Conveyor Corporation, Chicago, and New York, has produced a new type of ash-pit door as the result of careful tests and study, covering all points essential to successful operation and durability.

An ash-pit door should be of ample size to allow easy removal of the ashes from the pit, but should not be unnecessarily large. If too large, it is impossible to



AIRTIGHT ASH-PIT DOOR

keep the door from warping and thus leaking air, and it is also too heavy to be handled easily. A 24-in. x 36-in. door is ample for the largest pit and this is the size recommended for ordinary use. Three other sizes of doors are also built of the same general design. These are in size, 18 in. x 18 in., 22 in. x 26 in. and 24 in. x 24 in. The frame of the American ash-pit door is of cast iron with the hinge and locking lugs cast on. The frame is of an angle design and sets well back into the setting. It is easily fastened into the pit wall by four bolts, one in each corner. The door itself is of heavy cast iron and is provided with a heavy ventilated cast-iron liner to prevent contact with the hot ashes and consequent warping. The bearing surface of the door and frame is carefully machined to make an airtight joint.

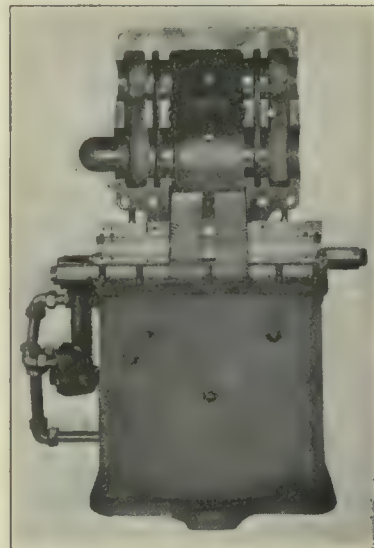
### Reduction Gearing for Turbine Users

TERRY reduction gears, manufactured by the Terry Steam Turbine Company of Hartford, Conn., are again on the market, not having been obtainable during the last year, due to the concentration of this company almost entirely on turbines for the destroyers. Although made primarily for use with Terry turbines, the gears alone are available as a separate speed-reducing mechanism.

The Terry gears and pinion are of the stub-tooth, double-helical type, generated to true form. A well-ribbed, double-walled, box-like structure, extending the full depth of the case, forms a rigid support for each pair of bearings. The space between the walls acts as a water jacket for cooling the oil. The ribs between the walls act both as stiffening members and water baffles. The central part of the case, directly under the gears, forms an oil reservoir which contains sufficient oil to supply not only the gears, but also the turbine. The bearings are split horizontally to permit their replacement without removing the couplings.

Oiling is provided for by a forced feed system, the ring oiling system having been found unsatisfactory for turbine reduction gear bearings. The oil pump is located

well below the oil level in the reservoir, to avoid suction lift. The oil is pumped from the reservoir through short, direct, brass piping to a self-cleaning strainer, thence through distributing passages to large, annular oil pockets around each bearing shell, and through the spray pipe from which the oil is sprayed, for lubrication of the gear teeth. The oil pressure gage is located in one of the above-mentioned annular oil pockets at the most distant point from the oil pump. The pump and its bevel gear drive make a complete unit without stuffing boxes, or exposed running parts. The pump gears may be removed for inspection without disturbing the driving mechanism or oil piping, and the bevel gears may also be inspected by removing a small cover. The gears may be furnished for either direction of rotation, the only change being location of the oil spray piping to lubricate the gears above or below the contact point.



NEW TYPE OF REDUCTION GEARING

### Equipment Inspection on a Kilowatt-Hour Basis

THE use of energy meters in connection with inspection of equipment was discussed by W. C. Bolt, Bay State Street Railway, in the issue of this paper for March 22. For convenience in quickly applying for this purpose the Economy railway meters already in use a card was devised to be placed over the lower part of the meter dial face, on which were printed the readings corresponding to inspection periods. Since the Bay State adopted this plan of car inspection the new meters which are hereafter sold to be used for equipment inspection purposes as well as a means for inducing economical car operation, are to be equipped with the set-back indicating dials, as shown in the accompanying illustration. A meter may have one, two or three of these inspection dials, as the plan of inspection for any property may require. On each dial are two pointers, a black one which rotates with the consumption of energy by the car, and a red one which is



ENERGY METER EQUIPPED WITH MECHANISM FOR USE IN CONNECTION WITH EQUIPMENT INSPECTION



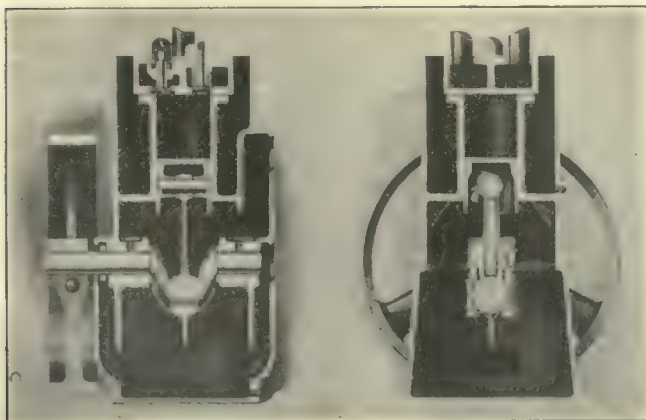
set at the value of energy consumption corresponding to which an inspection is to be made.

The inspection dial hands are, of course, geared in with the meter driving mechanism, but they can be reset to zero by means of reset rods with knurled heads projecting from the bottom of the case. These rods are ordinarily locked but can be released by use of a key. They are pushed upward to engage the spindle carrying the hands. The red hands are set by opening the front cover of the meter; hence cannot be tampered with by an unauthorized person. With this scheme of inspection all that is necessary is to tell the carhouse forces to hold a car in for inspection when the black hand reaches the red hand.

The plan of inspecting equipment on a kilowatt-hour basis is adaptable to any electric car or locomotive, alternating or direct current. On one large property it is estimated that if the present daily brake and controller inspections were put on this basis it would be possible to reduce by 50 per cent the present number of inspections without changing the present factor of safety. This plan for car inspection has been developed by the engineering staff of the Economy Electric Devices Company, general sales agents for the Economy railway meter.

### New Line of Small Air Compressors for Shop Use

THE Ingersoll-Rand Company of New York has recently placed on the market four sizes of Imperial Fourteen compressors. The capacity of these compressors runs from 3 to 45 cu.ft. per minute, at pressures up to 100 lb. per square inch. The small compressors can, however, be used for pressure requirements up to 200 lb. per square inch. They are single-acting machines of the vertical type built for belt drive. Where



LONGITUDINAL AND CROSS-SECTIONS OF SMALL WATER-JACKETED AIR COMPRESSOR

it is desired to drive them from a line shaft, both tight and loose pulleys are supplied. Where the use of independent motors is desired they can be furnished as a complete unit with the motor.

The compressor in the small sizes is built with a ribbed cylinder for air cooling, for use where the service is intermittent, and with water-cooled cylinders of the reservoir type for continuous operation. Larger machines are water-cooled only.

The general appearance of these compressors resembles somewhat an automobile engine. The crank-

shaft and connecting rod are of drop forgings, and automatic splash lubrication is provided. Their construction is illustrated in the accompanying cross-section views.

### Portable Electric Drill Used for Tightening Bolts

THE accompanying illustration shows a method that was used in the New York subway for tightening track bolts and screw spikes. A portable electric drill manufactured by the Van Dorn Electric Tool Company,



TIGHTENING A SCREW SPIKE WITH AN ELECTRIC DRILL

Cleveland, Ohio, was used to furnish the power. A socket wrench, inserted in the tool head fits over the head of the bolt and is driven in the same manner that a drill would be ordinarily. This provides a very efficient and rapid method for doing this work.

### Tool Tempering by Electric Heat

FOR the purpose of tempering tools the Westinghouse Electric & Manufacturing Company is using at its South Philadelphia Works an electric furnace in which a mixture of barium chloride and salt is kept in a fused condition and at any desired temperature by means of electric current. The furnace consists of a cast-iron cylinder about 3 ft. high and 3½ ft. in diameter packed with firebrick, with layers of asbestos. The central reservoir is 12 in. in diameter and 14 in. deep. The electrodes are set in the walls of the reservoir and the circuit is completed at starting by means of carbon sticks placed between them. Salt is fed into the reservoir and when it is fused it acts as a conductor and completes the circuit. The carbon sticks are then taken out and a mixture of barium chloride and salt is fed in, the final proportions being about 60 per cent barium chloride. The furnace throws off very little heat. It operates on a 16- to 30-volt a.c. circuit.



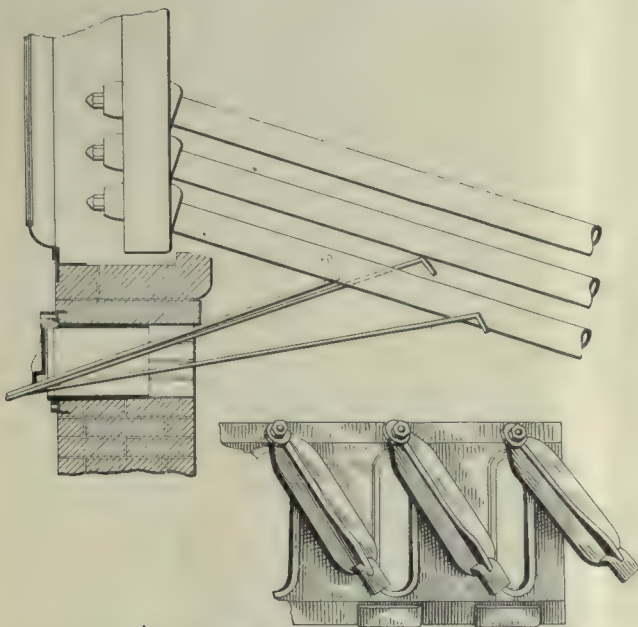
## Scraping of Boiler Tubes in the Boiler Setting

### A Casting with Openings in Front or Rear Wall of a Boiler Setting Gives Access for Scraping Off Cinder Deposit from Tubes

IN THE average boiler plant it is usual to operate the boilers at considerably above their rated or nominal capacity. High ratings are obtained by high air pressure under the grates, the effect of which is to lift small particles of incandescent coke and ash from the grates which are carried through the boiler in the furnace gases. A certain proportion of this coke or ash adheres to the bottom and sides of the tubes in the bottom row immediately above the fire.

A gradual building up of this cinder occurs which cannot be dislodged by the usual soot blowers or tube blowers, nor by the older hand lance method, and the only recourse is to cut the boiler out of service and scrape the cinder from the tubes after cooling down the furnace. This is an expensive operation and would be entirely unnecessary if means were provided so that it would be possible to scrape this cinder off the tubes while the boiler is in service.

The usual tube-dusting doors provided in horizontal water-tube boiler settings do not give access to the under side of the bottom row of tubes. To meet this condition the Combustion Engineering Corporation offers a tube scraping device illustrated herewith, the purpose of which is to provide openings in the front or rear wall of a boiler setting through which a light hook may be used for scraping the cinder from the bottom and sides of the lowest row of boiler tubes.



BOILER SETTING WITH TUBE SCRAPING DEVICE INSTALLED

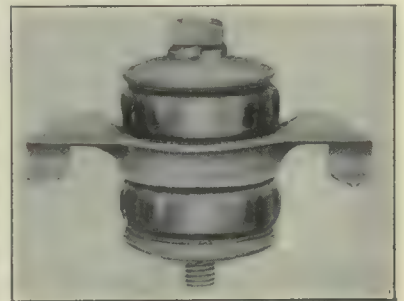
These boxes are made in sections of three, four and five doors which are spaced the same distance apart as the boiler tubes in the boiler in which they are installed. Two or more sections are bolted on angles or Z-bars along the top and bottom sides providing one opening or door for each space between tubes. The castings are of sufficient strength to support the brick wall above them and they will, when placed under

the rear header of a horizontal water-tube boiler of the Heine type, support the weight of the boiler also. The boxes are about 12 in. deep and heavily ribbed vertically between the doors or openings. When installed, the brickwork is so laid that the boxes are protected from radiant heat, and being in short sections of 21 in. to 35 in. in length will not warp and twist or loosen the brickwork above and below. Each opening is covered by a swinging door or cover, also of cast iron, the lower end of which passes behind a tapered spring catch which can be adjusted by a light blow of a hammer to hold the door tightly against the box.

When cleaning the tubes the attendant used a rod about  $\frac{3}{4}$  in. diameter and 10 ft. to 12 ft. long, of the same shape as an ordinary fire hook with one prong about 5 in. long.

## Trolley Wire Suspension with Grid Resistor Insulators

A NEW trolley wire insulator has recently been introduced by the General Electric Company of Schenectady, N. Y. This is called type P-2, and consists of two duplicate porcelain insulators, a malleable iron yoke, a stud bolt, together with insulating and locking washers. The particular feature is the renewable porcelain insulation, which replaces the usual molded insulating material. Many electric railways using G. E. equipment are already using these porcelain insulators for supporting the grid resistors underneath electric cars. For such roads there may be a certain economy effected by carrying the insulator in stock for more than the one purpose. The malleable iron yoke has reinforced lugs for holding the span wire, and is reversible, so that it may be used with the lugs turned either



NEW TROLLEY WIRE SUSPENSION

up or down, as preferred. The stud bolt passes down through the center of the insulator. By rotating this, the ear will be drawn up tight against the bottom of the suspension, with the ear properly aligned with the trolley wire, regardless of its angle with the cross-span wire. A lock washer under the head of the stud prevents the same from loosening and backing out. All metal parts are protected against corrosion by electric oven sherardizing.

## Cuban Engineers Organize

On Feb. 21, 1919, there was formed in Cuba, with headquarters at Havana, an "Association of Members of American National Engineering Societies." The society has been incorporated, and it will include members of engineering societies within reach of headquarters. It is planned to meet about four times each year at a dinner or breakfast, or on an excursion, the idea being to emphasize the social rather than the technical side of the engineer's life. About thirty men from Havana and vicinity attended the organization meeting and a larger attendance is expected at the first regular meeting to be held soon.



## Committee on Public Utilities Organizes

### U. S. Chamber of Commerce Names Individuals to Report on Utility Question—Committee Meets and Adopts Program

THE Chamber of Commerce of the United States has created a committee on public utilities, which had its first session, for organization purposes, at the headquarters of the national chamber in Washington on April 16. The committee is composed of eleven members as follows:

Lewis E. Pierson, Irving National Bank, New York, (chairman); Henry G. Bradlee, president, Stone & Webster Management Corporation, Boston, Mass.; Arthur W. Brady, president, Union Traction Company, of Indiana, Anderson, Ind.; F. B. DeBerard, director of research, Merchants' Association, New York; P. H. Gadsden, vice-president, United Gas Improvement Company, Washington, D. C.; E. K. Hall, Electric Bond & Share Company, New York; Albert W. Harris, president Harris Trust & Savings Bank, Chicago; Charles L. Harrison, Chief of Ordnance, Cincinnati District, Cincinnati, Ohio; J. W. Lieb, vice-president, New York Edison Company, New York; P. W. Myers, president, St. Paul Association of Public and Business Affairs, St. Paul, Minn.; James S. Havens, Eastman Kodak Company, Rochester, N. Y.

The Washington representative of the ELECTRIC RAILWAY JOURNAL reports that after the meeting it was evident that the committee was very much alive to the public utility situation in the country, particularly as it affects the electric railway companies and the power companies affiliated with them. A very elaborate program for assisting the public utilities of the country was laid out by the committee, although its details cannot be published until the committee frames its report, which is to be made to the directors of the national chamber. Nevertheless, it is stated that the committee plans to call speakers of national prominence to the coming annual convention of the national chamber in St. Louis, at which a public utility section will be established, as the committee fully realizes that the problems of the public utilities are among the most serious of the reconstruction period of the nation, and require immediate consideration and solution.

#### PUBLIC UTILITY DATA TO BE COMPILED

At the St. Louis convention it is expected that the committee will have speakers representing the banking interests, the views of labor, representatives of municipal leagues, mayors of cities and others. After the convention, the committee purposes to compile authoritative data on public utility matters, so that material for a referendum may be sent to the national chamber's membership. Then, it is planned, a report will be formulated by the committee, to be forwarded to each chamber of commerce throughout the United States, particularly to local chambers of commerce, to enlist the interest of all who desire to work out various phases of public utility problems.

The committee, it was informally stated, came more or less to the conclusion or belief, in general, that mere increases in fares will not solve public utility problems, and that it will be necessary to obtain relief from taxes, such as paving taxes and other local taxes, to get public opinion in support of skip stops, and to work out other economies which, it is believed, are not always possible now under the control of public utility commissions.

## A Portable Dispatcher's Office at Youngstown

### A New Plan for Facilitating the Handling of Fare Boxes and Car Records Was Inaugurated on March 1

ON THE Youngstown, Ohio, city lines until recently a condition existed which made it necessary for the company to devise a movable dispatcher's or fare-box office. The circumstances were these: It was formerly the custom to remove the Cleveland fare boxes from the cars at the Public Square where the used boxes were placed in the treasury of the Youngstown Municipal Railway and empty boxes were supplied to the cars. The cars have some little distance to go before reaching the operating yards and carhouses where they are stored and on the way they take in a number of fares. The cars thus reach the yards with some money in the fare boxes, and it proved very difficult to prevent theft of this money. Although the yards are well patrolled for general purposes the supervision could not be close enough to prevent the robbing of the boxes.

#### FARE-BOX CAR CONSTRUCTED

To overcome the above difficulty, and also to facilitate the handling of records on the cars, a new plan was put into effect on March 1 which involves the use of a portable dispatcher's or fare-box car stationed at the Haselton operating carhouse from which all Youngstown cars operate. This car is placed on the first track off the main line at the entrance to the carhouse when the cars are coming in during the evening and early night. All inbound cars stop at the fare-box car, and the fare boxes, car reports, trip sheets and time cards are removed by the dispatcher and placed in the car. This is furnished with fare-box racks along the side and a desk for the dispatcher. The car is an old single-truck car from which the seats were removed. On receiving the fare boxes the dispatcher gives the conductors receipts for them.

When all the runs are in, about 2.30 a.m., the fare-box car is run to the Public Square, where the loaded cash boxes are delivered to the accounting room of the treasury department and empty cash boxes are received and placed in the fare boxes. The car is then run to the operating yard, about 1000 ft. west from its first location, where it is placed on the No. 1 track off the main line. All cars operating out of the yards and carhouse in the morning pass this point and receive empty fare boxes and fresh trip sheets for the day's operation. Each conductor gives a receipt for his empty fare box.

The question might be raised as to why a fixed office would not have served the same purpose as the car. It could not be used in this case because all cars operate into one carhouse and out of both the carhouse and the yard. Hence portability was necessary. It might be mentioned also that between the time of the last run in and the first car out the dispatcher uses his time in checking time slips, car report cards and fare boxes. Obviously with this plan no thieving is possible and an excellent opportunity is afforded for casual inspection of the fare boxes. The plan described was worked out by R. Moses, assistant general superintendent of the company, which is a subsidiary of the Mahoning & Shenango Railway & Light Company.



## LETTERS TO THE EDITORS

### Mr. Schaddelee Defends His Plan

UNITED LIGHT & RAILWAYS COMPANY

GRAND RAPIDS, MICH., April 16, 1919.

To the Editors:

In your issue of April 12, on page 747, there is an article signed "Traffic Engineer." This article is a comment on my proposed plan of charging for street car fares.

If you had republished my entire article, so that "Traffic Engineer" could have read it, he would know that in my article I called attention to the injustice of charging the same fare to the short-distance rider as to the long-distance rider. The paragraphs I refer to are as follows:

The inherent injustice and inequity of any straight fare schedule is that it charges the same fare to all passengers, regardless of the distance they ride and regardless of the number of times they ride per year or month. There has been some deviation from a straight fare basis by the sale of six tickets for a quarter, etc., but these deviations have been few and have not removed the inherent injustice of the straight fare schedule. Theoretically and as a matter of equity and justice, the prices charged for street car service should be based upon two factors, viz.—first, the distance that the passenger rides, and second, the number of times the passenger rides per year or per month. The unfairness of charging a passenger the same fare for riding half a mile as for riding from 5 to 8 miles is readily appreciated and understood by everyone. For that reason there has always been much earnest discussion in regard to ways and means to eliminate this injustice, or at least reduce it, and as a result we have the zone system.

It is not my purpose to discuss this injustice of the fixed fare in connection with the distance of the ride, as this injustice cannot be solved apparently without the zone system, with its undesirable results in causing a congestion of population. The much greater injustice, to my mind, is the injustice of the fixed fare as applied to a passenger who uses the street car service say five or ten times per month, and the passenger who uses it from 40 to 100 times a month.

I believe "Traffic Engineer" and a good many other railway men have attributed decreases in riding to increased fares, when in many cases the decreased riding was due to other causes, and only a small portion of it due to the increased fare. In Cedar Rapids, Iowa, our company was voted a 6-cent fare by a direct vote of the people, yet for January, the first month when the increase was in effect, our total passenger revenue increased 26 per cent, and the number of passengers carried increased 9.4 per cent. In February, 1919, as compared to February, 1918, the increase in total passenger revenue was 23 per cent, and the number of revenue passengers carried increased 1.4 per cent, yet during these same two months we had other street railway companies, where the fare had not been increased at all, showing decreases in number of passengers carried.

My plan, as outlined in my article, is proposed in lieu of a straight 7-cent fare and provides for increases in the fares collected from every passenger. The casual rider will pay 10 cents just as easily as he will 5 cents, when it becomes necessary or convenient for him to use the street car, but the regular rider, especially the regular short-distance rider, is very apt to discontinue riding if he has to pay 7 cents every time he rides.

Under my plan the total increase to the regular

rider would be 50 cents per month, no matter how many times he rode. The large majority of the people who ride during the peak hours are daily riders who ride to and from their residence to their place of occupation. These people are not responsible for the fact that as a rule all places of employment start work at practically the same time, and I can certainly see no justice in penalizing them because they ride during the peak hour, as they cannot help themselves in that regard.

My plan was not offered as a cure-all, or as an absolutely perfect system of charging for street car transportation. I merely offered it as an improvement over the old straight fare plan.

"Traffic Engineer" seems to think that I do not appreciate the wrong principle of the flat fare as applied to long and short-distance riders. As I have stated before, if he had read my whole article he would know better. I know of no other way of getting rid of this injustice except by the institution of a zone system, which is impracticable in its application in the smaller towns, and which in fact is very objectionable in big cities also, first, because it congests population, and second, because it would cause a lot of opposition on the part of wage earning and salaried employees who have bought homes in the outlying districts of these cities where they can buy, build and live cheaply, and which action they took on the expectation that the straight nickel fare, having been in use for many years, would not be changed.

"Traffic Engineer" should know that the great majority of casual riders ride between the peak hours, and if he will make a check of the number of passengers riding and the number of passengers carried per car between the peak hours, he will find that the only reason that these riders are desirable at all is because the companies have to run these street cars in accordance with franchise regulations, regardless of profit, and that the only reason that the company can afford to run these cars during these hours is due entirely to the fact that during the peak hours the cars are loaded.

Heretofore the street car companies have followed the senseless method of giving low fares during the peak hours, by issuing school children's and workingmen's tickets, good only during the rush hours. Under my plan the passenger who rides the oftenest gets the lowest fare, no matter at what time of the day he rides.

"Traffic Engineer" is also mistaken, in my opinion, as to the discouragement of the casual rider by increasing his fare. Now-a-days the casual riders are very largely composed of visitors to a city, including traveling men, and the people owning automobiles, who use the street car when the weather is very inclement, when the streets are impassable, or when their automobile is out of commission. These people will pay 10 cents just as quickly as they will a nickel, for many of them are willing to take a taxi which will cost them ten to twenty times as much as a 10-cent street car fare. The street car companies need additional net revenue, and if they can obtain it, it does not make any difference whether there is an increase or a decrease in the number of passengers carried. Depreciation, interest and dividends can be paid only from what is left of the gross revenue after the operating expenses and taxes have been taken care of.

"Traffic Engineer" states that: "A successful fare increase must have two elemental qualifications; it must apply to a sufficient number of patrons to provide an



appreciable gain in gross revenues despite the inevitable decreases in patronage, and it must conserve net earnings by affording a minimum of discouragement to the most profitable classes of patrons." I claim that my plan includes both of these qualifications. There are two other vital considerations to be considered, namely, the plan must provide for the minimum of trouble, delay and inconvenience to the passengers and to the conductors, so as not to slow up the headway of the cars. My plan also provides for these qualifications.

"Traffic Engineer" and all street railway operators must remember that the public authorities and the public in general have their own ideas in regard to street car fares, and that we as street car operators cannot simply fix these fares in accordance with our own notions. At any rate, even the increase of a straight 5-cent fare to 6 cents, does not necessarily mean a loss in riding as is shown by our experience in Cedar Rapids, Iowa. The amount of riding is determined by the frequency of service, and the quality and comfort of the cars, rather than by the question of whether the rider has to pay 5 or 6 cents for his ride.

I am sure the great majority of automobile owners would not use the street cars daily, even if they were carried for nothing, and certainly no one would claim that it is cheaper for people to drive to and from work in an automobile, even as compared to a straight 10-cent fare. I know many automobile owners here drive their cars down in the morning and back at night, and they have to pay 20 cents a day for parking privileges.

R. SCHADDELEE, Vice-President.

### Mr. Ford Ought to Have a Heart

NEW YORK CITY, April 15, 1919.

To the Editors:

Henry Ford's promised novelty in surface car design may prove to be a wonderful boon to the electric railway operators, but pending its commercialization I wish that Henry would quit knocking the industry. We who are connected with electric railways must admit that at present we are down, if not out, and while our noses are rubbing the resin, it isn't fair for Mr. Ford to slam us with a lot of phoney statistics such as were used to bolster up the erstwhile crusade of the gallant young jitney bus against the old and wicked electric car.

Mr. Ford reproves the electric railways, through an *ELECTRIC RAILWAY JOURNAL* interview, for their absurd practice of carrying around ten times as much car weight as passenger weight—such as would be the case, I presume, with a 12,000-lb. one-man car accommodating fifty rush-hour passengers. This works out (unless I, also, have become a little loose in my methods of thought) to 240 lb. per passenger, which, incidentally, is just about what Mr. Ford's own automobile (the one that he sells; not the one he drives) will weigh per passenger, unless someone rides a-straddle on the radiator. Be that as it may, Mr. Ford's accusation of 10:1 ratio leaves us on the horns of a dilemma; either Mr. Ford has used the wrong scale on his slide rule or else he figures rush-hour patrons at 24 lb. each! Or perhaps he was referring to our worst mistakes in city car design which were built so long ago that we are almost ashamed to acknowledge remembrance of the weight of 46,000 lb. Here the capacity of 100 and the aforesaid 10:1 ratio would give us a weight for our rush-hour patrons of exactly 46 lb. apiece.

Part of our foolish practice in this regard, according to Mr. Ford, is due to our error in adhering to 5-in. axles when a 2-in. diameter in Mr. Ford's new steel would be sufficient. A word on this new steel is warranted. The antiquated metal called for by our Association standards has an elastic limit reaching up to 60,000 lb. The beam strength of circular cross-sections varies as the cube of the diameter, and the cube of 5 is fifteen times the cube of 2; so that the metal in Mr. Ford's new 2-in. axle, which surely is to be as strong as our out-of-date 5-in. monstrosity, evidently will have an elastic limit of 900,000 lb. per square inch. Some steel! It's too bad that the industry didn't know about this steel before. And with that admission of error we hope that Mr. Ford will be satisfied.

Seriously, all of us would like the new venture to succeed. The industry might benefit by it. But its success won't be made more likely if Mr. Ford closes his eyes to a lot of facts that the electric railways have been learning during the past thirty years. If gasoline at seven times the cost of electricity can be shown to be good for the industry, the industry will change its motive power. But the industry has been told this same thing once before when the jitney bus came forward with its historic glass crash. Now the industry wants to be *shown!*

F. KINGSLEY.

## AMERICAN ASSOCIATION NEWS

### Chief Engineer Sanborn Addresses Rhode Island Section

AT THE MEETING of the Rhode Island Company section, held at Providence on March 4, J. H. Sanborn, chief engineer of the company, discussed the topic, "Way and Structures." He traced the development of this part of the electric railway from early days as it kept pace with the evolution of traffic. The company orchestra furnished music during the evening. A house committee was appointed with F. A. LaVoice of the claim department as chairman. This committee served a simple luncheon at the meeting and also served in promoting sociability. An incident was the first meeting of two employees of the company who had conversed over the telephone for a period of twenty years. The meeting was attended by 140 members.

C. K. Savery has been appointed by the executive council of the Connecticut Company Section to fill the vacancy in the office of secretary created by the resignation of W. E. Jones. Mr. Jones has resigned his position with the company to take one with the Rhode Island Company at Providence.

In the report of the Milwaukee meeting of the Wisconsin Electrical Association, in the issues of this paper for March 29 and April 5, John St. John, assistant general manager Milwaukee Northern Railway, was inadvertently referred to as the retiring president of the association, instead of John St. John, vice-president and general manager Madison Gas & Electric Company.



# News of the Electric Railways

FINANCIAL AND CORPORATE • TRAFFIC AND TRANSPORTATION

PERSONAL MENTION

## Another River Tunnel

Both East Side and West Side Rapid Transit Lines in New York Operating to Brooklyn

Beginning Tuesday morning, April 15, at one minute after midnight the new Clark Street tunnel under the East River connecting the Wall and William Street station in Manhattan, with the Borough Hall subway station, in Brooklyn, was put into use by the Interborough Rapid Transit Company.

### EAST SIDE LINES USE OLD TUBE

The Fourth and Lexington Avenue (East Side) Interborough lines have been going through the old Battery tunnel to Brooklyn and will continue to do so. The Seventh Avenue Interborough lines, however, have heretofore had their terminus in lower Manhattan at Wall and William Streets. The Broadway-Seventh Avenue (West Side) trains, under the new arrangement, go to Brooklyn, but use the new Clark Street tunnel.

facilities, but of signal system and safety appliances, track alignment, clearance of cars, both as to ceilings and edges of station platforms, etc. Trial operation of trains proceeded each day until the line was opened to the public. The Times Square station at Forty-second Street, being in the heart of the theater district, the new line makes available to Brooklyn riders a service that promises to be very attractive.

### 20 MILES FOR FIVE CENTS

The longest ride available on a single fare will be from Atlantic Avenue to East 241st Street in the Bronx, on the White Plains Avenue line, a distance of 20.23 miles. On the steam railroads, at 3 cents a mile, the regular rate, the fare (exclusive of war tax) would be 61 cents.

The distance between Atlantic Avenue and Van Cortlandt Park on the West Side line is 16.85 miles, and for a steam railroad ride of that length the fare (exclusive of war tax) would be 51 cents. The Interborough lines have

## Public Utility Triangle

A Very Interesting Statement of the Case by British Columbia General Manager

George Kidd, general manager of the British Columbia Electric Railway, Vancouver, B. C., has explained to the employees of the company through their own magazine how the public utility executive behind the mahogany desk must try to secure an even measure of justice to the public, the employees and the investors. Mr. Kidd said in part:

I suppose lots of you who have worries must feel that it would be fine to be a general manager. I cannot speak for a private business, but I know that it is not altogether an enviable position in a public utility business.

### TRIANGULAR RELATIONSHIP EXPLAINED

In a public utility there is a triangular relationship between public, employees and investors. The shareholders have an equal duty to public and employees; the public has an equal duty to allow the employees and the shareholders fair wages; and the employees similarly have an equal responsibility to public and investors.

For a time, two of the three sides of the triangle may get more than their share, at the expense of the third; or one may get ahead of the other two; eventually there must be a readjustment.

The service we give the public is our estimate of the public's needs, commensurate with our resources, but in order to keep abreast with the public we ask for complaints and suggestions. Similarly, the management tries to learn the employees' needs and meet them.

The public is, unfortunately, not well acquainted with the investor. There are over 10,000 investors in British Columbia who have put their savings into securities of this company. Everybody acknowledges that saving money is a virtue, but as soon as the economical man or woman invests it he or she seems to be turned into a capitalist, with all the odium that the word conveys. The thousands of savings bank depositors in Vancouver are no different from the small investors in this company.

The employee is entitled to fair remuneration. Wages come from the public. The rates charged for service must be sufficient to pay the employees and the shareholders fair remuneration, the one for their work, the other for the use of their money. There is nothing to be ashamed of about capital. If we expect interest from the savings bank we should give investors in a company like this a fair return on their money.

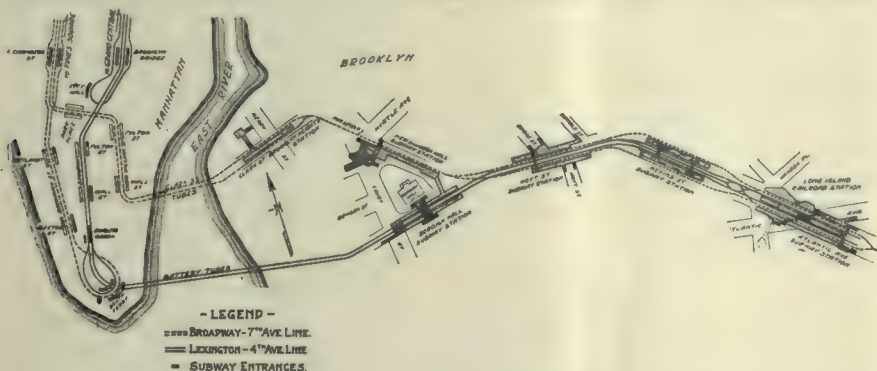
### THE INVESTOR IS REGULATED

Do the employees understand the investors and the public rightly? Neither the investor nor the employee can expect the public to pay anything they may ask. The investor already has submitted to regulation by the public in the form of the public utilities commissions, and has had the return on his investment restricted.

Similarly, employees cannot expect the public to think well of them if they ask the public to pay any wages they may demand, for wages affect rates.

I like to think of a company such as this as a trustee for the public. Our duty is not solely to pay a fair return on capital, but to fulfill our trust to the public in furnishing the best possible service at the lowest possible cost, while paying good wages to our employees and maintaining our fair share of the cost of government.

I am afraid capitalists of old would turn in their graves should they hear this open discussion of a company's business with its employees, but such is the trend of relationships between employer and employee to-day. We invite the public to investigate our business from their point of view, and as one of the other members of the triangle the employees have a similar privilege.



ROUTES OF INTERBOROUGH TUBES UNDER EAST RIVER

Tracks through the two tunnels come together at Borough Hall, Brooklyn, and make a four-track route in Brooklyn between Borough Hall and Atlantic Avenue.

### TEST RUNS APRIL 8

With the opening of the Clark Street tunnel, passengers from Brooklyn have a through direct express service to either the East Side or the West Side of Manhattan and to the Bronx, without change of cars at Rector or Wall Street, or change to the Forty-second Street shuttle.

The power was turned into the cables and third-rail for the first formal tests of the new Clark Street tunnel at 10 o'clock on the forenoon of April 8. The first test train was operated at 1.30 p. m. Tests were made not only of power

averaged in cost more than \$4,000,000 a mile.

### COST ABOUT \$7,500,000

The new line has been under construction since 1914 and cost, completed, between \$7,000,000 and \$8,000,000. The tunnel line consists of twin tubes, which enter the river in the vicinity of Old Slip, Manhattan, and cross to the Brooklyn side, extending down Clark Street to Fulton Street and thence to a junction with the existing Interborough lines in Brooklyn, at Borough Hall. It has been constructed under the direction of the engineers of the Public Service Commission, and directly in charge of Clifford M. Holland, the commission's tunnel engineer. The opening was attended with very little confusion to the public.



## Third Buffalo Arbitrator

Former President of Chamber of Commerce on Board with Messrs. Richey and Allison

Orson E. Yeager, lumberman and former president of the Chamber of Commerce of Buffalo, N. Y., has been selected as the third member of the board of arbitration which will determine the amount on which the International Railway will be allowed a return in any service-at-cost agreement that may be entered into between the city of Buffalo and the railway. Albert S. Richey is the city's representative on the board and James E. Allison, Jr., St. Louis, is the representative of the company.

The three arbiters held their first conference on April 15. The taking of testimony in the valuation proceedings will start within a week or ten days. The city and the company both have the right to reject the final report of the arbiters. The board will not fix the rate of return the company may eventually receive or the fare to be charged.

The bill permitting the city and the company to enter into a contract along the lines of the service-at-cost plan of Cleveland has been passed by the Legislature at Albany and a hearing will be held on it by the Mayor. The bill practically nullifies the 5-cent fare agreement embodied in the company's franchise. Whatever agreement is made will be subject to a mandatory referendum. There is a general feeling it will be overwhelmingly defeated by the voters again.

An agreement has been reached between the International and its union platform employees whereby the \$225,000 due the men as back pay and which was awarded them by the War Labor Board will be paid in installments. The money was due on April 1. After a series of conferences with E. G. Connette, president of the International Railway, the men have agreed to accept the sum in installments. The first payment of \$50,000 will be made on April 28; the second payment of \$50,000, on Nov. 14, 1919; the third payment of \$25,000 on Dec. 21, 1919, and the remaining \$100,000 on Jan. 28, 1920.

## Absence of Snow Helps

The New York Times has been figuring the saving that has accrued to the city, the public utility corporations and to individuals on account of the recent mild winter, with its almost total absence of snow. In discussing the matter from the standpoint of the electric railways the Times said:

Anything less than 2 in. of snow is not considered a storm by the electric railway companies. It was estimated by a railroad man that for each additional inch of snow above 2 in. the cost to each company is approximately \$5,000 an inch. In zero weather this is increased because the work proceeds slower, the wear and tear on equipment is greater, and more labor is required. The nearest approach to snow fighting this year was in the last storm when snow sweepers were held in readiness to be sent out. The cost of sending out a sweeper or a plow was estimated at about

30 cents a mile, this being greater according to the depth of the fall.

The cost of snow removal to the New York Railways in recent years was: 1913, \$42,324; 1914, \$138,509; 1915, \$53,957; 1916, \$149,022; 1917, \$73,478, and 1918, \$127,522. To the advantages of a mild winter must also be added the saving that comes in approximating schedules, for disorganized operation means a loss in efficiency of the service.

Here is a comparative table of snow removal costs:

Lines.	1916-1917.	1917-1918.
Third Avenue .....	\$92,000	\$99,000
New York Railways...	73,478	127,522
Brooklyn Rapid Transit	83,245	103,103
New York & Queens		
County Railway ....	2,790	6,043

## Ford vs. Birney

W. P. Strandborg of the Portland Railway, Light & Power Company, Portland, Ore., demands attention with "Picking on the Little Fellows," in *Watt's* for April 11. Mr. Strandborg says:

Once upon a time, Henry the Ford, now High Lord of Lizzieland, was a young blacksmith in a small town entirely surrounded by Michigan. And, one night a fool setting hen flew in from the village chestnut tree that stood in front of his door and located herself on a pile of scrap near the glowing forge. In due time she finished her task and there was a nice little gasoline coodle running around the place. Whereupon Henry the Ford threw a monkey-wrench at it and christened it "Flivver."

To-day, the entire civilized world will bear witness of the truth of this strange miracle and the State of Oregon is going to spend \$23,000,000 in the next three years to give more elbow-room to the "Flivvers." That's why we build more highways, these days.

### HAVE HAD LOTS OF FUN

It came to pass that all the world chuckled and smiled as Henry the Ford's little Lizzie began to cover the earth like seventeen-year locusts or a smelt run up the Sandy, but history fails to record that anybody refused to buy one if he had the price or ride in one if he had the chance.

But the funny writers and the comic papers and cartoonists had a pleasant spell while Lizzie was learning the ropes. And, Lizzie had too many good points to be kidded off the map—this is not a paid adv.

The arrival in our midst of the cute little Birney safety cars has been greeted with the same joyous and happy abandon. It has been the same in the many cities where the busy little Birneys have won their way into general popularity and where they have never been replaced after once being adopted.

### UNCLE SAM LIKES THEM

Not only have private street railway companies without number inaugurated Birney car service, but Uncle Sam, when he was brought face to face with the greatest war the world has ever known, was obliged to step in and solve the transportation situation in a score or more of great war-working industrial centers and shipyard cities. Uncle Sam built nothing but Birney safety cars, because they were the type of equipment that would best fill the bill, all things considered.

Our company was allotted twenty-five of these cars and they have been placed in operation on two of our lines—Irrington-Jefferson and Williams Avenue. Except in the case of a small handful of persons, the car riders on these lines have accepted the new type of car with marked approval.

Patrons on other lines have asked us when we were going to be able to extend our Birney car service to their districts. It is a peculiar fact that those who have expressed themselves real peevishly about the little "tanks," have not (and there is not a single exception) based their complaint on any defect in either service or equipment or on any condition of operation that would not, with equal force, apply to any other type of car.

### SAFETY DEVICES OVERLOOKED

The objectors, conscientious or otherwise, have overlooked the specific advantages that the Birney car possesses over other types of equipment, particularly in the matter of safety.

Most of the kickers, too, overlook the distinct improvement in service through the use of the Birney car whereby we are able to give more frequent service than we could with any other kind.

## Put Labor on the Board

Bridgeport Manufacturer and New Haven Director Sounds Note of New Industrial Democracy

Walter B. Lasher is one of the big business builders of Bridgeport, Conn. He has many corporation interests, but he also has many civic interests. He knows labor, its hopes and its aspirations. One of Mr. Lasher's jobs has been chairman of the Bridgeport Traffic Commission. In that post he has made a study of electric railway problems that has convinced him that a number of features of operation as at present followed need correcting. This has led him to suggest that labor be represented on the board of directors of the Connecticut Company or its local successors in Bridgeport if the segregation of the properties there is brought about. Mr. Lasher's views are highly interesting. They are interesting in themselves as such and also because they have evoked favorable reception from the local press. Mr. Lasher is quoted as follows:

If more boards of directors included in their make-up the men who had the grime of toil in their fingernails, everybody would be better off. Every community is full of the examples of successful men who have had to fight their way from the bottom—who have learned their business from the ground up. It's true of the trolley company, and it's true of every company.

A concern that employs as many workers as the Connecticut Company has a hidden capital of brains and executive ability in its men. Bring this ability to the top—give it an outlet.

I have a lot of faith in the men behind the controller and at the end of the trolley rope. Treat them like men—give them a chance. Why, at present, they are not treated like human beings at all, but simply like cogs in a machine. They are not known by their names, but by their numbers, like so many convicts.

Give them a chance to take a pride in their own ability. Put up their names in the trolley car. "This car operated by Motorman John Smith and Conductor Sam Jones," so that the passengers can know the operators and say "Good morning, Mr. Jones," when they get on, instead of seeing merely a number on a man's hat.

## Municipal Properties Subject to Commission Control

In a decision handed down by the Illinois Supreme Court on April 15 in the case of the Springfield Gas & Electric Company against the city of Springfield, the court held as unconstitutional the clause in section 10 of the public utilities act exempting municipally owned public utilities from the operation of the act. The court said:

The persons who use the products or service of public utilities are entitled to the benefits of the public utilities act and are entitled to its protection against extortion, discrimination and inferior service by whomsoever furnished. If a customer is oppressed by extortionate charges or discriminated against by wrongful rate or inferior service the wrong is the same whether done by a municipal corporation or a private corporation.

The fact that this section of the act is declared void does not affect the validity of the remaining sections. However, the ruling is likely to act as a damper on the ardor of certain Chicago Aldermen who claimed, in advocating municipal ownership, that the control of service would be removed from the jurisdiction of the State commission.



## Detroit Attacks Railway Problem Again

The defeat of municipal ownership at the recent election in Detroit, Mich., blasted the hope of the Street Railway Commission in finding relief from transit ills by this means, but it has not served to deter the commission from seeking elsewhere for possible help. At its meeting on April 11 the commission decided to invite Henry Ford to explain to the commission his plan for providing transportation by self-contained vehicles, and the members also concluded to proceed at once to examine into the details of the Tayler plan of operation as in use in Cleveland.

One thing seems certain, there will be no piecemeal construction of railway lines to compete with the Detroit United Railway. The commission has again gone on record to this effect. The reasons for this remain as strong as ever. They have been set forth before by the commission and were reviewed in the *ELECTRIC RAILWAY JOURNAL* for March 29, page 659.

In connection with the inquiry of the commission into the Tayler plan of operation Edward T. Fitzgerald, secretary of the commission, has been instructed to communicate with Fielder Sanders, street railway commissioner of Cleveland, and ask him for a comprehensive report on the plan, especially with respect to the valuation of the physical property. The members of the commission will probably visit Cleveland after they have had an opportunity to digest Mr. Sanders' reply.

## Mr. Ford Plans Experimental Road

Henry Ford, the automobile manufacturer, who last fall made application for a franchise to connect the blast furnace and shipyard at his plant with Michigan Avenue, is now applying for franchises on Fort Street, Boulevard and South Dearborn Road and running through Oakwood, Ecorse Township and Dearborn. The rate of fare specified in the franchise is a maximum of 2½ cents per mile with a minimum fare of 5 cents. It is over this proposed road evidently that Mr. Ford proposes to operate his new gasoline street car, about which he was interviewed in the *ELECTRIC RAILWAY JOURNAL* for April 12. In a statement attributed to him on April 11, Mr. Ford reiterated some of the points brought out by him in the previous interview. He is quoted as follows:

Gas-driven street cars seem to be the logical successors to the electrically driven cars and I am going to lend my efforts to building and operating the first one in this city.

If it proves itself by far the superior car, and there is no doubt about it in my mind, I will be willing to work out a system with Mayor Couzens or any private concern which is willing to take the manufacture over with the end in view of bettering transportation facilities.

We will build the first car this summer and operate on the streets. I have no personal interest in building this car aside from making it possible to offer Detroit

and the rest of the country a modern means of transportation. There are about 125,000 street cars in operation in this country to-day and there is need for about 500,000. If the car we build is what is wanted we will be glad to offer it to some one to manufacture.

The main trouble with transportation everywhere is the high fare. When this problem is solved transportation will be greatly improved. The gas-driven cars will make this possible. The public will get better service and the people operating the transportation system will make more money, because more people will travel.

## Court Upholds Receiver's Labor Attitude

Lindley M. Garrison, receiver of the Brooklyn (N. Y.) Rapid Transit Company, remains firm in his decision to deal with nothing but committees of the employees themselves. The recently organized union carried its case to the Mayor in the hope of having Mr. Garrison recede from the stand which he has announced, and, failing in this attempt, carried the matter to Federal Judge Julius M. Mayer, by whom Mr. Garrison was appointed.

The conference before Judge Mayer was held on April 16. He upheld Mr. Garrison in his refusal to recognize the Amalgamated Association. Judge Mayer asserted, however, that the unionists had misunderstood the receiver's position. He suggested that the men obtain their representation through a general election by the entire body of Brooklyn Rapid Transit employees.

In this connection he suggested that a committee so prominent in the community that its integrity would be beyond dispute be selected to aid the employees in choosing their representatives. He made the point plain, however, that the entire body of employees should be represented. He said that he wanted it understood that the receiver was ready at any time to hear any and all grievances which the employees might desire to present, but that grievances which he declared of the first class—namely, matters of general application as distinguished from specific cases of some wrong claimed to have been done to an individual person—should be presented by all the employees of the system and not by a part of the employees.

The union representatives reported back to the men at a meeting on the night of April 17 and the men voted to postpone the strike indefinitely. At that meeting a telegram was read from Governor Smith in which he expressed the hope that the organizers would delay action "until we have had an opportunity to talk it over." Union leaders promptly arranged for a conference with the Governor at Albany on April 18.

During April 17 the company announced that the tower and signal men had been granted an increase in wages. In a letter to Judge Mayer, Mr. Garrison said that no man would be discharged who did not deserve discharge by a breach of discipline. No man would be discharged because he chose to join a labor or other organization.

Mr. Garrison said he had also arranged for proper settlement of any personal grievances presented by employees. It seemed to him that this met the situation in a rational way and assured justice and fairness to all concerned.

## Appeals Against Wage Reductions

Union employees are already taking steps to guard against a reduction in the wage scales established by the War Labor Board. The Amalgamated Association, through its president, sent letters on April 11 to the Governor of Illinois, the Mayor of Chicago, the State Public Utilities Commission of Illinois and the management of the Chicago Surface Lines, appealing for protection against a wage reduction.

The Chicago Surface Lines contract, which became effective on June 1, 1917, does not expire until June 1, 1920. A wage scale of 30 cents to 39 cents over a five-year period was in force when the War Labor Board set a standard wage of from 43 cents to 48 cents last August. The Surface Lines appealed to the State commission for relief in the way of a higher fare which has not yet been granted, and the employees are fearful lest the company exercise its option of returning to the contract scale of wages when the War Labor Board award expires with the official declaration of peace. This is said to be one of the few companies, affected by the War Labor Board ruling, which has a contract to fall back upon with the end of the war. The management of the company has not stated its position with reference to the action to be taken when this time comes.

## Illinois Public Utilities Act Satisfactory

The Illinois Senate committee on public utilities recently held a hearing on all bills affecting the public utilities act, and representatives of the Illinois Electric Railways Association appeared with representatives from the Illinois State Electric Association, the Independent Telephone Association and the Bell interests to protest against any change in the present law. About 190 representatives of the various interests met at luncheon in Springfield, and the effect of the proposed legislation was explained in detail by attorneys representing the utilities' interests, by a representative of the Chicago Association of Commerce, and by a representative of the Investment Bankers' Association of America.

At the hearing before the Senate committee some twenty speakers, including representatives of the public, the investors and the utility interests, addressed the committee in behalf of their respective organizations. It was the unanimous opinion that this meeting was very successful, and at the present time indications are that there will be no drastic changes made in the public utilities law.



## News Notes

### Railway Accepts Franchise Renewal.

—The directors of the Cleveland (Ohio) Railway, have accepted the city's renewal of the Tayler grant until 1944.

### Soldiers First in Des Moines.

—Emil G. Schmidt, president of the Des Moines (Ia.) City Railway and the Interurban Railway, has ordered all heads of departments to give all returning soldiers and sailors preference in filling positions on these systems.

**City Loses Traction Appeal.**—The Court of Appeals has upheld the dismissal by the lower courts of the action of New York City against the Brooklyn, Queens County & Suburban Railroad to recover about \$800,000 in percentages of gross receipts under the railroad law.

**Governor's Commission Plan Accepted.**—The Senate of New York, on April 15 without debate, and on a short roll call, unanimously adopted the plan of Governor Smith for the reorganization of the Public Service Commission in New York city. The new plan calls for a new regulatory commissioner and a commissioner in charge of construction.

**Wage Arbitration in Scranton.**—By a unanimous vote the union of employees of the Scranton (Pa.) Railway on April 7 agreed to the arbitration of their demands for increased wages and time and one-half for overtime. Several other minor items in the demands for a new agreement are also to be arbitrated. The motion to accept arbitration also included provision for the acceptance of the concessions made by the company on other demands.

**Would Fix Strike Costs.**—Fred Robertson, Federal District Attorney for the Kansas district, has filed in Topeka, Kan., a motion to tax the costs of the protection of the Kansas City Railway during the strike last winter. The total cost up to April 1 was \$29,722, of which the railway paid \$14,522 on order from Judge Pollock. In making his restraining order last winter Judge Pollock reserved the right to assess the costs of the protection against any of the parties, the city, the railway, and the Amalgamated Association. This petition is to ascertain upon whom the rest of the costs shall be placed.

### Louisville Judge Rules War Is Over.

—Judge Walter Evans of the United States District Court at Louisville, Ky., recently rendered a decision of interest in connection with awards of the War Labor Board. Judge Evans upheld the contentions of a well-posted attorney representing a client in the local court. It was held that the war was over, the decision being based on an address of President Wilson before a joint session of Congress just after the signing of the armistice, when the President stated that the war was over and reiterated

the statement. The President as Commander in Chief of the Army has this right.

**Powers of Iowa Commission Increased.**—A bill which will work to the advantage of the electric railways of Iowa was passed in the Senate of the Iowa Legislature during the week ended April 12. The bill increases the powers of the present State Railroad Commission and authorizes that body to regulate rates and services of the electric railways. The present situation of the Des Moines City Railway was considered in the debate which preceded the passing of the bill. A number of the strongest members of the Senate defended the bill. The vote was nearly two to one in favor of its adoption.

**Transit Bills for Philadelphia Advanced.**—The Senate committee on appropriations on April 9 voted to report favorably two transit bills introduced by Senator Daix, one of which would empower the Public Service Commission to order the Philadelphia (Pa.) Rapid Transit Company to make extensions and improvements to its lines. The other bill, identical in its text and purpose to the Salus measure, which was defeated in the House at the last session, would obligate the Philadelphia Rapid Transit Company, under the discretion of the Public Service Commission, to establish transfer points and joint rates of fare with other companies to permit through routing of trains and cars.

### So the Company May Know and Profit.

—The Portland Railway, Light & Power Company, Portland, Ore., has inaugurated an "Employment Record Department" in charge of Mr. Warner. The purpose is to facilitate inter-organization promotions—i.e., to use talent in the company's own ranks that might otherwise not become known at the time the men were needed. The plan includes new as well as old employees. The department will not employ men, but will prescribe forms of records for all employees and see that they are filled out and kept in convenient shape. Mr. Warner will spend six weeks in a study of employment management at Reed College, after which he will develop the plan more fully.

**Wage Increase in New Albany.**—A voluntary average wage increase of 5 cents an hour has been granted to the employees of the Louisville & Northern Railway & Lighting Company and the Louisville & Southern Indiana Traction Company, as well as the men on the city lines at New Albany and Jeffersonville, Ind. This action was made following an announcement of the Inter-State Commerce Commission granting a 2-cent increase, to 7 cents, between Louisville and Jeffersonville and Louisville and New Albany. Interurban men will receive from 38 cents to 44 cents an hour. City conductors will receive 29 cents to 33 cents an hour, and motormen 32½ to 41½ cents. The new agreement holds for one year, or until it is renewed.

**Conciliation Fails in New Jersey.**—Union leaders in Newark, N. J., are

drawing up a petition to the War Labor Board in view of their failure to reach an agreement with the Public Service Railway on the question of a nine-hour day with ten hours' pay. The conference on April 14 ended in a deadlock. The company said it would grant everything except the nine-hour day, but the union officials, insisting on this point, demanded its submission to the War Board for consideration. The company then announced that all the other points would have to be passed on by the War Labor Board. The present proceedings are in accordance with the terms under which the recent strike on the lines of the Public Service Railway in Newark was settled.

### Wants Interurbans Built Now.

—The Board of Commissioners of the city of Dallas, Tex., has called on the holders of the railway franchise granted by the city and of the interurban franchise between the city and C. W. Hobson to appear before the board to show cause why these interests should not proceed at once to carry out their agreement to build and operate two interurban lines out of Dallas. Under the terms of the franchises granted during the administration of Mayor Lindsley these two interurban lines, each at least 30 miles in length, were to have been built and in operation within a period of three years. Due to the war this time was extended, but now that the war is over and business conditions are fast becoming normal the city authorities feel that the railway interests should proceed to carry out their agreement, for which they are under bond to the city. The original agreement was that the two interurban lines should be under construction within six months after Oct. 1, 1917. The Dallas Railway and the Texas Electric Railway are the holders of the franchises.

## Program of Meetings

### Chamber of Commerce of the United States

The program for the seventh annual meeting of the Chamber of Commerce of the United States, to be held in St. Louis, Mo., April 28 to May 1, has just been published. The headquarters will be at the Statler Hotel. On the afternoon of Monday, April 28, there will be a meeting of the National Councilors, and in the evening a meeting of the Advisory Council of the War Service Committees. The first general session will be held at the Coliseum on the morning of April 29, with a second general session in the evening and group meetings in the afternoon. The same program will be followed on April 30, and on May 1 there will be two general sessions, together with two sessions of organization secretaries. The speakers will include the Secretary of the Treasury, the Secretary of Commerce, the Chairman of the United States Shipping Board, the Railroad Administrator, and others prominent in business and government circles.



# Financial and Corporate

## Receiver in St. Louis

**Tottering for Many Months, United Railways Joins Long List of Roads Now in Courts' Hands**

Rolla Wells, former Mayor of St. Louis, Mo., and recently Governor of the Eighth Federal Reserve District, St. Louis, on April 12 was appointed receiver of the United Railways Company, which operates all the local St. Louis lines. The appointment was made by United States District Judge Dyer as the result of a petition entered in the court on April 11 by a New York stockholder in which the railway company joined.

### JUDGE LAMM SPECIAL MASTER

Judge Dyer also announced that before the time came for the settlement of claims by the receiver he would appoint Judge Henry Lamm of Sedalia as special master to hear the representations of the various claimants and pass on the receiver's report. Judge Lamm has been serving as special master in the original receivership suit brought by John W. Seaman, New York, a stockholder.

Former Judge Henry S. Priest, chief counsel for the United Railways, and Charles W. Bates, former city counselor, who was one of the attorneys in the Seaman receivership suit, were appointed by Judge Dyer as attorneys to the receiver.

The appointment of a receiver was due to the inability of the company to meet a loan of \$3,235,000 from the War Finance Corporation. Samuel W. Adler, who made the application for a receiver, is the holder of \$135,000 of underlying bonds of the St. Louis Transit Company. The naming of Mr. Wells forestalls the suit of John W. Seaman, a stockholder, who some time ago started an action to have an accounting, with the ultimate view of having the courts take charge of the properties. The railway joined in the application on which the appointment was made. The petition to the court stated that action was taken for the purpose of preventing the dismemberment of the system.

### WAR FINANCE LOAN NOT RENEWED

The loan granted by the War Finance Corporation in June, 1918, was for six months and has never been formally extended. An issue of \$3,500,000 of Union Depot Railroad 6s, an underlying issue, matured on June 1, 1918. To meet this issue, the railway borrowed from the War Finance Corporation, and \$3,487,000 of the bonds were retired, leaving a total of \$13,000 still outstanding.

A plan to pay off the War Finance Corporation loan was under way when the receiver was appointed. The com-

pany had an application before the Missouri Public Service Commission to issue \$2,160,000 of one-year 8 per cent notes. This, with treasury cash and Liberty bonds, would have enabled the company to pay the loan. To do this, it was purposed to deliver the \$3,487,000 Union Depot bonds to the trustee of the first general gold 4s who in return would deliver a like amount of the 4s still unissued. These bonds, it was planned, were to be deposited as collateral for the new note issue.

Following the admission of insolvency by the United Railways it was announced that the two committees formed for the protection of the company's general mortgage 4 per cent bonds, due in 1934, will hereafter work together in the interests of these bonds only.

Breckinridge Jones, president of the Mississippi Valley Trust Company, St. Louis, is chairman of one committee, and N. A. McMillan, chairman of the board of the St. Louis Union Trust Company, is chairman of the other bondholders' committee.

### COMPARATIVE INCOME STATEMENT OF LEHIGH VALLEY TRANSIT COMPANY FOR YEARS ENDED NOV. 30, 1917 AND 1918

	1918		1917	
	Amount	Per Cent	Amount	Per Cent
Gross earnings.....	\$3,320,145	100.0	\$2,875,073	100.0
Operating expenses and taxes.....	2,433,620	73.3	1,840,419	64.0
Net earnings from operation.....	\$886,525	26.7	\$1,034,654	36.0
Non-operating income.....	142,834	4.3	144,755	5.0
Gross income.....	\$1,029,359	31.0	\$1,179,409	41.0
Depreciation allowance.....	43,761	1.3	141,146	4.9
Interest on funded debt.....	563,319	17.0	554,602	19.3
Interest on floating debt.....	50,499	1.6	9,347	0.3
Debt discount and expense.....	23,523	0.7	0,777	0.7
Net income.....	\$348,256	10.4	\$453,537	15.8

The other members of the committee headed by Mr. Jones are David R. Francis, Jr., of Francis Bros. & Company, St. Louis; A. G. Hoyt, of the National City Company, New York; A. H. S. Post, president of the Mercantile Trust & Deposit Company, Baltimore, and F. H. Ecker, treasurer of the Metropolitan Life Insurance Company, of New York.

## Arkansas Company Extends Operations

The Arkansas Light & Power Company, Arkadelphia, Ark., has acquired in fee the property of the Arkansas Public Service Company, which owns franchises and transmission lines in the great rice belt of eastern Arkansas, the property in fee of the Denning Coal Company, the controlling interest in the Pine Bluff Company, at Pine Bluff, Ark., operating 9.5 miles of electric railway, and the controlling interest in the Missouri & Southeastern Utilities Company.

The company has effected a perma-

nent financing of this purchase by the sale to bankers of bonds and stock, and the floating debt of the company has been paid. The bonds are secured by a first mortgage on all of the company's property, with the exception of a small underlying mortgage on one of the plants, which is being reduced annually.

In order to provide for its future power needs the company has started construction of a transmission line from England through Little Rock to the coal fields near Russellville, where it will build a central power plant.

The mortgage provides for the issuance of \$5,000,000 bonds. Of this amount \$1,824,000 has been issued. The capital stock outstanding consists of \$2,440,000 common and \$1,500,000 7 per cent cumulative preferred.

## Lehigh Transit Loses

**War Conditions and Heavier Taxes Cause Twenty-three Per Cent Reduction in Net Income**

The gross earnings of the Lehigh Valley Transit Company, Allentown, Pa., for the year ended Nov. 30, 1918, showed a gain of \$445,071 on 15.5 per cent as compared to the preceding fiscal year. The total operating expenses and taxes, however, rose \$593,200 or 32.2 per cent. As a re-

sult the net income finally suffered a loss of \$105,281 or 23.2 per cent.

The year's decline was the direct result of war conditions and heavier taxes. The company's annual report does not present any subdivisions of earnings or operating expenses and taxes, so that only the general showing can be indicated. Owing to the smaller net income in 1918, the preferred dividends were discontinued.

The depreciation allowance for 1918 was \$43,760 as compared to \$141,145 in 1917. The accrued depreciation reserve, which has been accumulated from the balances left each year since 1911 from an amount equal to 22 per cent of gross railway earnings after the payment of maintenance and renewal expenses, was \$284,352 on Nov. 30, 1918. The year before this balance was \$312,279.

The surplus earnings of the allied Easton Consolidated Electric Company for the last year were \$101,756. This sum resulted in a profit of \$46,304 on the investment for the Lehigh Valley Transit Company.



### Schedule in Bankruptcy Filed

Schedules in bankruptcy of the Interborough Consolidated Corporation, the holding company of the Interborough Rapid Transit and the New York Railways, were filed in the Federal Court at New York on April 14 by the receiver, James R. Sheffield. They are incomplete for the reason that the bankrupt is the owner of stock in other corporations the value of which is problematical. For the purposes of the schedules the stock is placed at par value.

Its largest liability is the half-yearly interest due on April 1 on approximately \$67,825,600 of 4½ per cent bonds on which the company defaulted. The interest due, about \$1,500,000, is cumulative. The bonds are secured by \$33,912,800 of the capital stock of the subsidiary Interborough Rapid Transit Company.

The total liabilities, according to the schedules, amount to \$69,685,264. A list of about 2500 bondholders accompanied the schedules.

Among the assets are promissory notes of the Interborough Rapid Transit Company, \$1,300,000; unliquidated claims, \$124,291, consisting of interest due on Interborough-Metropolitan collateral trust bonds; deposits in banks, \$544,967; loan to the Interborough Rapid Transit Company, \$500,000; one year 6 per cent notes of the Interborough Rapid Transit Company, \$800,000, and demand notes of the Rapid Transit Subway Company, a subsidiary of the Interborough Rapid Transit Company, \$1,000,000.

The bankrupt company holds 96.89 per cent of the \$35,000,000 capital stock of the Interborough Rapid Transit Company, \$15,061,600 of the \$17,495,000 capital stock of the New York Railways and \$1,035,741 of the total capital stock of \$2,350,000 of the New York Transportation Company, commonly known as the Fifth Avenue Bus Company.

Receiver Sheffield has reduced the expenses of running the bankrupt company from \$41,534 a year to \$3,721.

### Want Foreclosure Sale Set Aside

Decision was reserved by Justice Charles B. Sears of the Supreme Court at Batavia, N. Y., on April 14 on the show-cause order argued before him in connection with the sale of the Buffalo, Lockport & Rochester Railway, Rochester, N. Y. The order asked why the sale of the road on March 12 for \$500,000 should not be set aside. The property was bought by Willis A. Matson and William F. Foster, Rochester, acting for a bondholders' committee and a new corporation, the Rochester, Lockport & Buffalo Railroad Corporation.

The action was brought by W. Crawford Ramsdell and Samuel T. Church, Albion, N. Y., bondholders and stockholders of the original company. It is claimed by them that the property was worth more than \$500,000 and that, in fact, an ex-

pert has stated that the road could be junked and sold, exclusive of right-of-way, for \$963,000. Proof was offered that on a resale bids would be made for at least \$640,000. Moreover, it was claimed that \$174,000 cash in the possession of the Buffalo, Lockport & Rochester Railway went with the property, so that the buyers really bought the road for \$325,000. It was said that the \$174,000, had it been used to pay the interest on the bonded indebtedness of \$2,799,000, would have made the foreclosure sale on March 12 unnecessary.

Collusion between some of the incorporators of the new Rochester, Lockport & Buffalo Company, the Lincoln Trust Company, New York, trustee of the mortgage, and some of the officers of the Buffalo, Lockport & Rochester company was charged. It was claimed that the fact that the railway had on hand \$174,000 was not made known to prospective bidders until the time of the sale.

Messrs. Ramsdell and Church own \$4,000 of bonds, \$7,755 of preferred stock and \$9,025 of common stock of the Buffalo, Lockport & Rochester Railway. They were represented at the show-cause proceeding by Fluhrer, Reed, Wage & White, Albion. Gerard, Scott & Bowers, New York, appeared for the Lincoln Trust Company and William Osgood Morgan, New York, for the bondholders' committee comprising R. Holmes Smith, Frederick Nichols and D. B. Manna, Toronto. Harris, Beach Harris & Matson, Rochester, appeared for Willis A. Matson and the Rochester, Lockport & Buffalo Company, which has already applied to the Public Service Commission for permission to issue \$3,700,000 of stock.

### New York Tax Law Needs Change

In a recent paper prepared for the National Tax Association by M. H. Hunter, of the University of Illinois, in regard to the taxation of public utilities in the State of New York, it is stated that the laws are too complex. Furthermore, there is no way of comparing tax burdens on different classes of property.

In Professor Hunter's opinion, the addition of the special franchise tax has no justification, and its attempted administration has filled the courts with litigation and has failed to bring justice and satisfaction. From the difficulties experienced under the present system, it would seem advisable to follow the example of some other states and adopt some unit method of taxation, either the earnings or the ad valorem basis.

If this were done it would be comparatively easy to extend the system to mitigate the present outstanding inequalities and injustices of local assessments. Finally, it is believed that utility property should be taxed at about the same rate as other property, "unless it be desired that the users of public utilities should bear especially heavy or light tax burdens."

## Financial News Notes

**No Offer for Bowling Green Lines.**—Pursuant to an order issued by the Court of Appeals the property of the Southern Traction Company, Bowling Green, Ky., was offered for sale on April 7, with a provision that it was to be operated. The minimum bid of \$21,000, set by the court, was not received, however, and the property will now probably be offered for sale as junk.

**Receiver for Chattanooga Company.**—John Graham, Philadelphia, and Percy Warner, Nashville, were appointed receivers of the Chattanooga Railway & Light Company, Chattanooga, Tenn., on April 17 by Federal Judge Sanford. The action was taken on the petition of the Commercial Trust Company, Philadelphia, Pa., representing the holders of \$2,790,000 of the company's first mortgage bonds.

**Common Stock Dividend Increased.**—Henry L. Doherty & Company, New York, N. Y., announce that the monthly distribution on Cities Service Company bankers' shares, payable on May 1 to shares of record of April 15, will be 41.1 cents on each share. This compares with a monthly disbursement of 39.6 cents on April 1 and is equivalent to an income return of approximately 13½ per cent annually on bankers' shares at their present market price.

**Common Stock Dividend Resumed.**—The directors of the Pacific Gas & Electric Company, San Francisco, Cal., have resumed dividends on the common stock at the rate of 1½ per cent quarterly. An initial quarterly cash dividend of 1½ per cent on the common stock was paid in April, 1912, and continued to April, 1913, when it was passed. The dividend was resumed in March, 1916, and paid to October, 1917, when discontinued.

**Successor Interurban Organizes.**—The Rochester, Lockport & Buffalo Railroad Corporation, organized as the successor to the Buffalo, Lockport & Rochester Railway, Rochester, N. Y., sold under foreclosure recently, has organized as follows: E. R. Wood, president; A. S. Muirhead, vice-president, and W. W. Foster, secretary, treasurer and general manager. Directors: E. R. Wood, F. Nicholls, R. Home Smith, D. B. Hanna, A. S. Muirhead, F. W. Zoller, W. A. Matson, W. W. Foster and D. M. Beach.

**Worcester Bonds Extended.**—On petition of the Worcester (Mass.) Consolidated Street Railway for approval of an agreement for an extension for a period of two years of the company's twenty-year first mortgage bonds to the amount of \$115,000, the Massachusetts Public Service Commission has approved an agreement made between



the railway and the American Trust Company, trustee, whereby the maturity of the bonds is extended two years from Jan. 1, 1919, and the interest on the bonds is increased from 5 per cent to 7 per cent per annum.

**Governor Signs Gross Receipts Tax.**—The Morgan bill re-enacting the gross receipts tax on utility corporations, which was recently signed by Governor Edge of New Jersey, provides for a tax upon the gross receipts of these concerns rather than upon the taxable gross receipts as contained in last year's act, thereby producing 12 to 15 per cent more revenue. The reason for a re-enactment rather than an amendment, it is stated, is because the act passed by the last Legislature was approved prior to the general tax act and there was a question as to whether the general tax act did not complicate or repeal the provisions of the gross receipts tax act.

**Unfavorable Report on Successor Company.**—Acting on the unfavorable report of the committee on incorporation the Connecticut House has rejected the bill authorizing the Somers Electric Company to buy the property of the Hartford & Springfield Street Railway and conduct the railway in South Windsor, East Windsor, Windsor Locks, Enfield and Somers. Advocates of the bill claimed that the organization of the Somers Electric Company was merely a "preparedness" measure in order that some corporation might be in a position to acquire the railway in case reorganization or change in ownership became necessary. The Hartford & Springfield Street Railway is now in the hands of a receiver.

**An Echo of the Lorimer Failure.**—The claim of the Lorimer-Gallagher Construction Company, Chicago, Ill., against the Southern Traction Company, East St. Louis, Ill., for \$850,000 was allowed by Federal Judge English in a decree filed at Danville, Ill., on March 30. However, it recognizes the

priority of claims totaling \$110,000 for right-of-way and other expenses incurred before the road was built. The road is ordered sold, but no date is fixed. The same decree provides that the La Salle Street Bank, Chicago, Ill., also one of former Senator Lorimer's enterprises, which is in the hands of a receiver, must surrender to the construction company \$1,200,000 of the traction company's bonds, which it has been carrying as "book assets" of the bank. The litigation was begun five years ago by J. Y. Sanders on a note for \$100,000 against the traction company, turned over to Sanders by C. B. Munday, who was sentenced to five years' imprisonment for wrecking the La Salle Street Bank, of which he was vice-president.

**Would Issue \$1,054,000 of Bonds.**—The Hudson & Manhattan Railroad, New York, N. Y., which operates under the Hudson River between New York and New Jersey, has applied to the Public Service Commission for the First District of New York for an order to permit the company to issue \$1,054,000 of 5 per cent bonds under the company's first lien and refunding mortgage. The company states that the principal will be used for the reimbursement of its treasury for expenditures made for additions and betterments to its property, and in part for paying obligations incurred by the company for the purchase of rolling stock. The application, states that of the whole amount applied for \$308,500 face value is on account of expenditures for betterments and improvements amounting to \$246,800. The larger amount is needed to cover this sum, because the bonds will be sold at 80. The sum remaining under the application—namely, \$745,000, face value—is on account of expenditures amounting to \$188,500 for retiring underlying mortgages and \$460,000 for payments for rolling stock.

**Financial Clouds Hang Over Washington.**—During the past four months,

under the 5-cent rate, the City & Suburban Railway, included in the system of the Washington Railway & Electric Company, Washington, D. C., it is stated, has failed by \$15,522 to meet its fixed charges. In any event the company is now running at a loss and means have not been devised for replacing all the cars damaged in the recent fire. Report that the Washington & Great Falls Railway & Power Company, which operates a line through Maryland to Great Falls, would discontinue operations on account of lack of funds was denied by its officials. Arrangements have been made to carry it along temporarily, at least. This concern rents both power and cars from the Washington Railway & Electric Company.

**Seattle Sells Railway Bonds.**—The city of Seattle, Wash., has finally sold \$400,000 of bonds for new construction. They are now being offered for subscription. On Aug. 10, 1918, the City Council passed an ordinance adopting a plan for additions, betterments and extensions to the existing municipal railway system. The plan adopted called for the construction, equipment, maintenance and operation of a single or double-track railway from East Eighty-fifth Street and Tenth Avenue Northeast; also on East Marginal Way, also on West Spokane Street to Admiral Way, being three distinct additions to the municipal railway lines as they then existed. The estimated cost of these improvements was placed at \$1,200,000. Early in January, 1919, the Council issued a call for bids for \$400,000 of the bonds to be applied to the payment of construction costs. No bids for these bonds were received on the opening day, Feb. 1. Recently R. M. Grant & Company, New York, and the Oscar P. Dix Company, Seattle, submitted a joint bid for \$400,000 of the bonds, which was accepted. The bonds bear interest at 5½ per cent per annum, and are payable in twenty years. They are an obligation dependent upon railway earnings.

## Electric Railway Monthly Earnings

### ATLANTIC SHORE ELECTRIC RAILWAY, SANFORD, ME.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Feb., '19	\$10,850	\$10,599	\$251	\$458	†\$207
1m., Feb., '18	8,261	11,696	†3,435	422	†4,857

### BANGOR RAILWAY & ELECTRIC COMPANY, BANGOR, ME.

1m., Feb., '19	\$81,841	\$54,110	\$27,731	\$20,645	\$7,086
1m., Feb., '18	67,485	*51,493	15,992	19,942	†3,950
12m., Feb., '19	942,247	*606,873	335,374	240,445	94,929
12m., Feb., '18	887,921	*520,282	367,639	230,385	137,254

### CHATTANOOGA RAILWAY & LIGHT COMPANY, CHATTANOOGA, TENN.

1m., Feb., '19	\$142,147	*\$109,326	\$32,821	\$21,273	\$11,548
1m., Feb., '18	137,791	*106,144	31,647	30,565	1,082
12m., Feb., '19	1,858,986	*1,446,404	412,582	285,866	126,716
12m., Feb., '18	1,422,833	*1,211,754	211,079	361,669	†150,590

### COMMONWEALTH POWER, RAILWAY & LIGHT COMPANY, GRAND RAPIDS, MICH.

1m., Feb., '19	\$2,036,430	*\$1,314,916	\$721,514	\$540,602	\$180,912
1m., Feb., '18	1,619,202	*1,154,493	464,709	478,854	†14,145
12m., Feb., '19	22,784,373	*15,155,763	7,628,610	6,159,414	1,469,196
12m., Feb., '18	19,894,954	*12,893,881	7,001,073	5,382,618	1,618,455

### CUMBERLAND COUNTY POWER & LIGHT COMPANY, PORTLAND, ME.

1m., Feb., '19	\$198,998	*\$143,811	\$55,187	\$56,657	†\$1,470
1m., Feb., '18	211,037	*188,824	22,213	70,702	†48,489
12m., Feb., '19	3,198,977	*2,200,296	998,681	830,883	167,798
12m., Feb., '18	3,068,576	*2,216,916	941,660	829,466	112,194

### EAST ST. LOUIS & SUBURBAN COMPANY, EAST ST. LOUIS, ILL.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Feb., '19	\$338,383	*\$278,572	\$59,811	\$69,946	†\$10,135
1m., Feb., '18	311,063	*224,992	86,071	66,648	19,423
12m., Feb., '19	4,309,937	*3,392,686	917,251	819,869	97,342
12m., Feb., '18	3,742,457	*2,602,427	1,140,030	789,726	350,380

### HOUGHTON COUNTY TRACTION COMPANY, HOUGHTON, MICH.

1m., Jan., '19	\$24,455	*\$19,133	\$5,322	\$5,041	\$281
1m., Jan., '18	29,422	*20,554	8,868	5,075	3,793
12m., Jan., '19	315,099	*214,066	101,033	60,237	40,796
12m., Jan., '18	343,802	*218,322	125,480	61,150	64,330

### NASHVILLE RAILWAY & LIGHT COMPANY, NASHVILLE, TENN.

1m., Feb., '19	\$252,993	*\$180,479	\$72,514	\$39,879	\$32,635
1m., Feb., '18	198,928	*127,155	71,773	40,626	31,147
12m., Feb., '19	2,988,074	*2,009,660	978,414	479,812	498,602
12m., Feb., '18	2,454,308	*1,596,230	858,078	489,526	368,552

### PORTLAND RAILWAY, LIGHT & POWER COMPANY, PORTLAND, ORE.

1m., Jan., '19	\$703,547	††\$445,902	\$257,645	\$186,811	\$70,834
1m., Jan., '18	589,787	††\$344,825	244,962	178,895	66,067
12m., Jan., '19	7,780,890	††\$5,228,113	2,552,777	2,226,103	326,674
12m., Jan., '18	6,123,067	††\$3,661,231	2,461,836	2,148,609	313,227

\* Includes taxes. † Deficit. †† In January, 1919, \$21,106; January, 1918, \$17,571; twelve months, 1919, \$542,925; twelve months, 1918, \$198,278, included for depreciation.



# Traffic and Transportation

## Domestication As a Solution

**Bridgeport Man Wants Local Lines Controlled Locally, with Manager and Employees as Directors**

W. B. Lasher, chairman of the Traffic Commission of Bridgeport, Conn., has replied in the *Bridgeport Standard Telegram* to the question propounded by it, "What to your mind is the best way to get the 5-cent trolley fare in Bridgeport, secure adequate service and transform a trolley failure into a trolley success?" Mr. Lasher's reply outlines a complete program for the operation of Bridgeport's lines for Bridgeport's benefit. Mr. Lasher advocates:

Formation of a Bridgeport corporation to lease from the Connecticut Company all rights for the tracks, wire, power and material for the operation of the trolley service in the city of Bridgeport.

Purchase of 100 Birney one-man safety cars.

Reduction of the fare within the city limits to 5 cents.

Control of the Bridgeport lines to be put in the hands of a board of directors so selected as to assure operation of these lines for the best interest of all concerned. This board to be made up of five men, as follows:

1. A representative of the trolley men—the actual operators of the line in question.
2. A representative of the Common Council of Bridgeport—say, the chairman of the streets and sidewalks committee.
3. A representative of the investors who furnish the new capital for the proper equipment and operation of the Bridgeport lines.
4. The local trustee of the Connecticut Company (Charles E. Sanford), to represent the lessors of the rails and operating rights.
5. The manager of the local traction lines.

Mr. Lasher explains:

Understand that this is only a rough outline, but I believe it embodies a workable plan and can be put into effect without further decree of the United States courts, or other complications which make for doubt and delay.

The basic ideas are twofold. They are:

1. To give the people the service to which they are entitled at the 5-cent fare, justifying this fare by improvements in equipment and economies of operation which will assure a fair return to the investors.
2. To restore the old feeling of confidence and co-operation between the city's most important utility and the community which it serves by separating the Bridgeport lines and putting them under a control that is democratic and representative.

That to my mind, having a representative of the trolley men act as one of the five controlling directors, is one of the most important factors in the whole plan.

We must recognize the fact that no element in the success of a great utility is more important than the human element—the people who actually perform the work of operation. The man behind the controller box must have a voice in the opera-

tion and direction of the company he serves.

Finally, the manager of the local lines should be included as a director, for obvious reasons. He, with the men under him, shares the responsibility for the practical operation of the lines. And like the men under him, he gets his orders from the top too often without having a chance to voice the results of his own ability and practical experience.

The five directors would then represent all the interests having a stake in the operation of the lines and should be able to bring about that condition of mutual confidence, helpfulness and responsibility which means so much in the operation of a public utility.

This situation, in a company backed by local capital, responsive to local wishes, alert to the changing demands of service, should make the present trolley troubles vanish like mist on the horizon.

## Everybody Pays in Seattle

**Those Who Expected Era of Free Rides to Be Ushered in Keenly Disappointed**

The time-honored custom of extending free transportation on city railway lines in Seattle to patrolmen, detectives, firemen and city employees ended at midnight on April 8, by order of Thomas F. Murphine, Superintendent of Public Utilities and head of the municipal traction system. The only exceptions to the straight nickel fare are the student conductors and motormen on observation trips, and municipal railway employees when their duty requires them to be on the cars.

### MR. MURPHINE BACKED BY LAW

It has developed that Mr. Murphine is backed in his fight to abolish free fares by a city ordinance passed last July fixing fares on the municipal railway. The ordinance provides that the fare shall be 5 cents and no authority is given any city employee to ride free.

An order abolishing tickets has also been announced, and all commutation tickets issued by the Puget Sound Traction and the municipal traction lines will be redeemed.

Mr. Murphine also proposes to abolish school tickets as soon as the present supply is exhausted, and substitute a metal disk. He states "tickets are an economic waste, and a nuisance. The new school disks will go into the fare box just like a nickel."

The police department is leading in the campaign against the edict of Mr. Murphine abolishing free fares. Chief of Police Warren asserts that he was promised by Mayor Hanson that if the department would work for the municipal purchase, he would see that none of the privileges enjoyed by the police were disturbed. Chief Warren also asserts that the efficiency of the police department will be materially affected, as many of the patrolmen will walk to and from their beats, rather than pay fare, causing loss of much time.

## Jersey Fare Hearings

**Commission Has Before It Plea for Seven-Cent Fare, Pending Conclusion of Zone Inquiry**

At the time of the order of the Board of Public Utility Commissioners of New Jersey to the Public Service Railway to restore the 6-cent fare, the question of the future rates for the company was left with the hearing on the application for a 7-cent fare set for April 7 and the hearing on the proposed zone plan set for April 14. Thus they are entirely separate proceedings, both of which are still in progress.

### PROFESSOR ANDERSON QUESTIONED

On April 7 Prof. Henry C. Anderson, head of the mechanical engineering department of the University of Michigan, under Dean Mortimer E. Cooley, a company witness, was unavoidably absent and an adjournment was granted by the commission to April 14. On that date Professor Anderson testified that the physical valuation of the company's property was \$99,417,442, or at the rate of \$117,000 a mile of track, exclusive of power houses. He believed the figures he gave as an appraisal were fair, for rate-making purposes, and said that a company must get a fair return for what it actually possessed or else returns on the original investment must be increased when the cost to reproduce showed itself to be higher in successive years. He explained at considerable length the details under which the inquiry to establish the appraisal value had been conducted. Professor Anderson also testified as to the cost of reproducing the physical properties of the railway based on labor and material costs between 1911-1915, 1914-1918 and for 1918, the totals rising from \$113,504,471 for the first period to \$163,648,707 for 1918.

In the matter of the other fare proceeding before the board, postponement of one week was granted on April 14 to the several municipalities concerned in which to gather their evidence for presentation in opposition to the restoration of the 7-cent fare asked by the railway pending the adoption of the proposed zoning plan.

### NO LONG POSTPONEMENT

City Counsel Congleton and other municipal representatives urged that a postponement of three weeks be granted. Vice-President Wakelee of the railway stated the company was entirely willing to submit to an investigation of its affairs, but he felt that the 7-cent fare should be restored at once, pending the board's decision on the zoning plan. He said:

The facts justify the application, and show the necessity for it. The company is facing insolvency as the result of a mounting deficit and this board might just as well say no to our application as to grant an adjournment of three weeks. Our treasury is empty, there is a huge deficit. The company wants to do business. Facts as to our operating expenses stand and no amount of investigation will controvert these facts.



## Milwaukee Increase Denied

Commission's Estimate of Future Revenues and Expenses Leads It to Refuse Relief

The Wisconsin Railroad Commission on April 5 handed down a decision denying the petition of the Milwaukee Electric Railway & Light Company for increased fares in Milwaukee and the suburban districts. The general attitude of the commission was that its hopeful estimates of the company's future revenues and expenses afforded it no ground for granting rate increases which would result in giving more than a fair return.

In connection with ordering a changed accounting method under which the property of a strictly railway character will be kept apart from properties of other sorts, the commission used substantially the valuation found in other cases but rearranged it. It found that the value of the strictly railway property in the single fare area was \$15,991,305, including \$500,000 for materials and supplies. Similar totals for the suburban railway property would be \$1,320,698 without materials and supplies and \$1,363,198 with an allowance for these items. The interurban property was valued at \$5,425,444. The power property of all the company's utilities was segregated, amounting to \$11,318,752, and fixed charges on such property appear among the expenses of the railway department as a portion of the cost of power. The total value of all the properties of the company, excluding materials and supplies, was placed at \$45,603,154 as of Dec. 31, 1918, except for additions to the Milwaukee Light, Heat & Traction property since 1914.

In considering the company's revenues and expenses, the commission stated that the last six months of 1918 included the period of highest operating costs, and that reductions rather than further increases were likely to come. Moreover, it believed that gains would be made in the revenues, which had been held down by the influenza epidemic and other causes. It therefore laid aside the actual revenue and expense figures for the last half of 1918 and compiled a statement of what it believed would be "normal revenues and expenses at present price levels for materials and labor and with revenues on the present basis for a future half-year period." This estimate of the commission would lead to an amount of \$671,684 available to meet a return of 7½ per cent or \$599,674 on the railway property in the single-fare area.

A similar estimate for the suburban-fare-area revenues and expenses showed a deficit of \$8,849 for the six months, which would fall short \$59,969 of a 7½ per cent return on the suburban railway property. The consolidated statement for both single-fare and suburban areas, however, would show a margin of about \$13,000 per half year above a 7½ per cent return.

In regard to the rate of return, the commission said that, while in many

cases it had indicated that 7½ per cent return on fair value was not under the circumstances in the cases decided an unreasonable return, these holdings were not to be taken as necessarily meaning that the earning of such a return should be provided at all times under all conditions for all utilities or for all departments of utilities. Nor is the failure to earn 7½ per cent a proof that rates may be advanced.

The commission added that for some time it had noticed an inadequacy of car supply leading to actual loss of revenue, and it could not neglect this fact in a rate case. It estimated that seventy-one new cars are needed under its modified service standard. Before making any final order directing such a purchase, however, it offered to the company an opportunity to present helpful data.

## Omaha Company Appeals

Carries Its Fare Case to Supreme Court on the Ground of Confiscation Under Present Rates

The Omaha & Council Bluffs Street Railway has filed in the Nebraska Supreme Court an appeal brief from the findings and judgment of the State Railway Commission of Nebraska in connection with the company's petition to charge a 7-cent fare on its lines within the city of Omaha.

The case will be called for hearing on May 5. After a recent extensive hearing before the commission that body issued an order to the effect that the company had not made a full and complete showing as to operating revenues, and expenses and fixed charges, properly chargeable to the Nebraska property. The company refutes that statement. The commission further ruled that the case should be continued for the taking of additional testimony, and directed its engineering department to check physical valuation, and its accounting department to check books and records of the company during its entire life.

### COMPANY CLAIMS CONFISCATION

The company, in its brief just filed with the Supreme Court, says that the 5-cent fare has become not only unreasonable but confiscatory. It asks for an emergency rate increase.

Among the financial statements shown in the brief are the following:

Company's valuation figures...	\$19,755,400
Valuation by commission's expert .....	20,948,038
Outstanding bonds .....	9,619,000
Outstanding stock .....	8,990,000
Maintenance and operation, 1914 .....	1,608,231
Maintenance and operation, 1918 .....	2,467,000
Estimated increase of maintenance and operation for 1919, compared with 1914 .....	1,321,518
Fixed charges per year .....	480,950

Unless the present 5-cent fare is increased, the company figures that earnings for 1919 will fall short by \$422,600 of the amount necessary to pay interest on the bonds. The company sets forth that a large item of increased expenditure was due to increase of wages to motormen and conductors which became effective on June 1, 1918, and another increased scale of wages effective on July 17, 1918.

## Six Cents in Spokane

Companies Sought Seven Cents and Concessions from City Looking Toward Consolidation

Following the hearing in Spokane, Wash., before the Public Service Commission on April 2, on the application of the Spokane Traction Company and the Spokane & Inland Empire Railroad for 7-cent fares the commission, as noted very briefly in the *ELECTRIC RAILWAY JOURNAL* for April 12, page 761, issued an order making a 6-cent fare effective immediately for a ninety-day period. The new rate was set to go into effect on all lines on April 6. No change in the present transfer or school-ticket system is made. It was proposed to supply conductors with strips of five tickets to be sold for 30 cents, as an accommodation to those not wanting to handle pennies.

### WAGE INCREASE ANNOUNCED

Officials of the railways conferred after the fare decision had been handed down and announced a wage increase to platform men of 6 cents an hour, effective the same time that the 6-cent fare went into effect.

The hearing opened on April 2, with the cross-examination of Mayor Fassett by the attorneys for the railways.

The Mayor contended that the figures of the Spokane Traction Company for maintenance were too high.

Will G. Graves, attorney for the Traction Company, read into the record the War Labor Board recommendation for increased wages for traction employees.

D. L. Huntington, president, recalled in rebuttal, protested against using the increased revenue figures for the first of this year as a basis for figuring income. He said:

We cannot prognosticate the future by a few days' spurt one way or the other. For instance, the figures of increased traffic for the first twenty-one days in March are not borne out by the remaining days of the month, although weather conditions were ideal.

### CONCESSIONS TO RAILWAYS

On the eve of the hearing before the commission, the City Council offered its first concessions to the railways when it passed a resolution favoring consolidation of the two lines and agreeing to submit to the people amendments to the city charter which would assist in bringing about the merger. The concessions which the Council proposes in the charter amendments are:

Relief from the car mileage tax.  
Abrogation of all paving burdens, excepting those necessarily imposed upon the streets by the railways themselves.  
Suspension of all charges for the use of bridges.  
Elimination in the franchise of competitive lines which would be torn up after the consolidation.

Officials of the railways declare that they will immediately take steps to bring about the consolidation of the railways within the ninety-day period set by the Public Service Commission. They see no reason why the company and the city should not know exactly where they stand in ninety days if both sides act with diligence.



### Attractive Los Angeles Posters

The first two of a series of cards being placed on the cars of the Los Angeles (Cal.) Railway are reproduced in the accompanying engravings. The cards are printed on both sides and placed in the upper bulkhead windows, so they may be easily read from both

as it stands to-day. It thinks the public should be proud of its railway. So that the public may judge for itself, the company purposes to give an account of its stewardship.

And every man who is open-minded and fair will approve this determination to rout ill will with candor, to confront prejudice with facts and in the friendliest spirit to discuss problems which only cordial co-operation can solve.

When the citizens of Dallas granted the

## Transportation News Notes

### The TALE OF THE RAIL

25 years ago

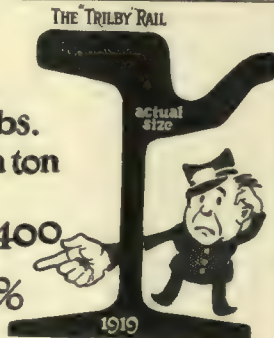
today—

Weight—40 lbs. to the yard --- ➡ 116 lbs.

Cost—\$40 a ton ----- ➡ \$112 a ton

Rails for mile of single track cost \$2500 ➡ \$20,400

*an increase of 716%*



A STUDY IN RAIL SIZES AND COSTS, LOS ANGELES RAILWAY

inside and outside sections. No comment of any kind, outside of a direct statement of the fact, will appear on any of the cards. The cards have been received in a spirit of good-will by patrons, and apparently have excited increased interest in the general problem confronting the railway. They are unusually attractive from a typographical standpoint, much of which merit is necessarily lost in reproduction and in reduction in size from the original.

### Dallas Company Keeps Its Promise

Under the head of "Keeping Faith with the People," the Dallas (Tex.) Railway is running a five-column advertisement

present management the railway franchise, certain promises were made to make certain extensions and improvements on the Dallas Railway. In order that our people may know what extensions and improvements were promised, and the progress made as of this date, we are itemizing them below.

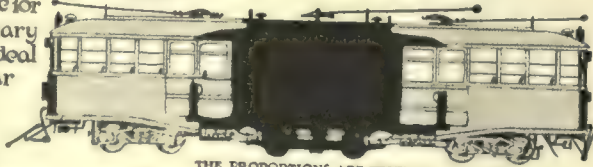
At this point in the advertisement there appears a list giving in detail the work being carried out. As the individual items of which it is composed are not of general interest elsewhere than in Dallas it has accordingly not been included here. The advertisement concludes as follows:

You will observe that the Dallas Railway is "keeping faith with the people." The above improvements represent an actual outlay in dollars and cents of \$860,550. Every part of the material represented by the above has been ordered. This is your railway and you are entitled to know what we are doing, and what we intend to do in the future toward bettering the railway

## TWENTY-FIVE YEARS AGO —and today

The new type of car shown here cost \$8,000—you can build a pretty fine home for \$8,000—and with ordinary care it will last a great deal longer than a street car

*the difference between the trolley car of that day and this—*



THE PROPORTIONS ARE TRUE ~

A STUDY IN CAR SIZES AND COSTS, LOS ANGELES RAILWAY

tisement in the Dallas newspapers setting forth in detailed form the improvements promised under the service-at-cost franchise granted by the city and the progress made on these improvements to date. The introduction to the advertisement follows:

As a public utility, with a whole city to serve, the Dallas Railway recognizes that it has a public trust to discharge. It realizes that while the company and the public have mutual obligations, the rights of the public must come first.

The company is proud of the property

service in this city. We are firm believers in the open door. Our cards are on the table, face up. Your interests are our interests. We want the people of the city of Dallas to know the facts about the Dallas Railway

Could anything be fairer?

### I. T. S. Preparing for Summer

Officials of the Illinois Traction System, Peoria, Ill., are arranging the summer time card. It will become effective on or about May 1.

**Six Cents in Paducah.**—An agreement was reached on April 2 between the City Commissioners and the Paducah (Ky.) Traction Company, whereby fares will go to 6 cents. For the past six months a 7-cent fare has been effective. The company is now in the hands of a receiver.

**Terre Haute-Indianapolis Increase Authorized.**—On application filed by the Terre Haute, Indianapolis & Eastern Railway, Indianapolis, Ind., the Interstate Commerce Commission on April 14 authorized the company to increase fares for the purpose of increasing revenues to meet advanced material and operating costs.

**Wants a Ten-Cent Fare.**—The Massachusetts Northeastern Street Railway, Haverhill, Mass., has filed notice with the Public Service Commission of Massachusetts of an increase of single passenger fares from 6 cents to 10 cents, effective May 7. However, five tickets can still be bought at the old rate, or five for 30 cents.

**Interurban Increases Fare.**—The Fort Wayne & Northern Indiana Traction Company, Fort Wayne, Ind., has increased the fares from 2½ cents to 2½ cents a mile, following an order of the Public Service Commission of Indiana. No decision has been made yet in reference to the increase in city fares. The company asked for an increase of 1 cent on the city lines.

**Referendum Asked at Akron.**—Opponents of the city ordinance providing for an increase in fares to 6 cents in Akron, Ohio, on the lines of the Northern Ohio Traction & Light Company late on April 8 filed petitions for a referendum signed by more than 8000 voters. City officials said that the referendum would be submitted at a special election not later than May 20.

**Seven-Cent Fares at Worcester.**—The Public Service Commission of Massachusetts issued an order on April 14 establishing a cash fare of 7 cents in place of the former 6-cent unit on the Worcester Consolidated Street Railway. Tickets are to be sold by conductors in strips of ten for 65 cents. An increase of approximately 33½ per cent is ordered in workingmen's tickets, and pupils' tickets are to be sold at the rate of ten for 35 cents.

**Yonkers Increase on April 18.**—The Yonkers (N. Y.) Railroad has formally accepted the conditions of the ordinance passed by the Aldermen recently and granting the company the right for a period of two years to charge a 5-cent fare on the cars within the city limits and an additional fare on the cars that cross the city line in either direction. The acceptance, dated April 6, makes it



possible for the railroad to put the new fare plan into effect on April 18, as under the terms of the ordinance it becomes operative ten days after being accepted by the company.

**Canadian Fare Increase.**—The City Council of London, Ont., on April 7 adopted by a vote of six to five a resolution to grant increased fares to the London Street Railway on condition that the company improve the service in respect to time and speed. The measure, City Solicitor T. G. Meredith advised, will require the assent of the Legislature, and if opposition is offered it is possible that the franchise act will be invoked to compel a vote of the people before the scheme becomes effective. The present fares are 5 cents cash, seven regular tickets or nine workingmen's tickets for a quarter.

**Sees Hope in One-Man Cars.**—One-man cars are being urged by A. D. Mackie, general manager of the Springfield (Ill.) Consolidated Railway. Mr. Mackie does not favor an increase in fare beyond the present 6-cent rate. It is his opinion that the falling off in patronage that would follow a further fare increase would more than offset the additional revenue secured. The only alternative is a reduction of operating expenses. A principal means to this end would be the elimination of the conductor on the cars. The plan of the company would be to introduce one-man cars gradually.

**Transfers Discontinued.**—The hearing on the complaint of Jamestown against the Warren & Jamestown Street Railway and the Jamestown Street Railway before the Public Service Commission for the Second District of New York over the proposed discontinuance of transfers on April 15 was adjourned by the commission on April 8 at the request of the city and companies. The answer of the Jamestown Street Railway alleges that "it is under no obligation imposed by statute, franchise or otherwise to issue transfers to or honor transfers from the Warren & Jamestown Street Railway line," an arrangement which it proposed to discontinue on April 15 because of a substantial loss of traffic and revenue.

**Wants Class Freight Rates Revised.**—The Indiana Railways & Light Company, Kokomo, Ind., has filed a petition with the Public Service Commission of Indiana asking for a revision of class freight rates on interline shipments. The petition sets forth that shippers are complaining that the interurban rates for hauls more than 80 miles are more than steam road rates and that considerable long-haul business is being lost by the electric railways because of this difference in rates in favor of steam roads. A letter accompanying the petition says that it was filed in accordance with an understanding reached in an informal meeting with Public Service Commissioners Lewis and Edwards on March 28 and that no action is to be taken on the petition until the other electric railways have filed similar petitions.

## Legal Notes

### ALABAMA—Ordinance to Transport Police Officers Construed.

An ordinance of the city of Montgomery requiring the traction company to furnish free transportation to police officers when in uniform was construed to entitle a plain clothes man wearing only a badge to free transportation. (*Montgomery Light & Traction Co., vs. Avant*, 80 Southern Rep., 497.)

### ILLINOIS—Where There Was No Grant, There Need Be No Performance.

Where a street railway, upon obtaining its franchise, obligated itself to a park board, having jurisdiction of streets, to pave certain street intersections not required to be paved by its franchise from the city, the contract was *nudum pactum*, since the company derived its right to operate on the streets from the City Council, and the park board had granted nothing. (*South Park Commissioners vs. Chicago City Ry.*, 122 Northeastern Rep., 89.)

### INDIANA—There Are No Degrees of Negligence.

As a matter of law there can be no degrees of negligence, and hence no degrees of duty. Hence, the use of such terms as "slight care," "great care," "highest degree of care," or other like expressions in instructions, as indicating the quantum of care the law exacts under special conditions and circumstances is misleading and constitutes an invasion of the province of the jury. (*Union Traction Company of Indiana vs. Berry*, 121 Northeastern Rep., 655.)

### KENTUCKY—Responsibility of Master for Improper Use of Appliances.

The rule requiring the master to exercise a proper degree of care to guard dangerous instrumentalities owned by him applies only where the instrumentality is dangerous in itself and not where it becomes dangerous from improper use.

Where the employees of an electric company, instead of putting wire used for repair in a safe place, connected it with a high-voltage wire with the avowed intention of injuring thieves, it was held that they were not acting within the scope of their employment so as to render the employer liable to trespassers who came in contact with the wires. (*Craig's Administratrix vs. Kentucky Utilities Co.* *Craig vs. Same.*—209 Southwestern Rep., 33.)

### MASSACHUSETTS—Violation of Rules Constitute Negligence.

That a street car went fast past another car going in the opposite direction after a stop, and that the motorman did not sound the gong, both

violations of the street railway's rules, was negligence, in an action for injuries to a boy struck by the car. (*Prennergast vs. Boston Elevated Ry.*, 122 Northeastern Rep., 318.)

### MASSACHUSETTS—Person Injured Crossing Through One Car to Reach Another.

A person on the platform of an elevated railway attempted to pass through a car to reach the other side of platform to take her train and was caught in the door of the first car and injured. She was held to be at most a licensee, to whom the railroad owed no duty except to refrain from wanton misconduct. (*Rhodes vs. Boston Elevated Ry.*, 122 Northeastern Rep., 194.)

### MICHIGAN—Conflicting Jurisdiction Over Fares of State and Federal Court.

Where a street railway filed a bill in a federal district court attacking a city ordinance fixing maximum fares, the State court did not then have jurisdiction of a bill filed by the city to secure an injunction restraining the street railway from collecting any fares in excess of those specified in the ordinance. (*Detroit United Ry. vs. Dingman*, 170 Northwestern Rep., 641.)

### NEW JERSEY—Cost Where Municipal Contractors in Street Were Unnecessarily Slow.

Where contractors adopted a method of constructing a sewer which unnecessarily interrupted travel for eight months on a street railway line, the actual cost of taking up the tracks, laying temporary tracks, and restoring the situation, should be paid by the contractors, under P. L. 1903, page 164, Sec. 7, and P. L. 1907, page 29, Sec. 5. (*Public Service Ry. vs. Frazer, et al.* 105 Atlantic Rep., 387.)

## New Publications

### Boiler Water Treatment

Reprint of Engineering Bulletin No. 3 prepared by the United States Fuel Administration in collaboration with the Bureau of Mines, Bureau of Mines Technical Paper, No. 218. Copies may be procured from the Superintendent of Documents, Government Printing Office, Washington, D. C., five cents per copy.

### Opportunity Monographs

Vocational Rehabilitation pamphlets for disabled soldiers, sailors and marines to aid them in choosing a vocation. Prepared by the Federal Board for Vocational Education and issued in co-operation with the War and Navy Departments. Government Printing Office, Washington, D. C.

### The Engineering Experiment Station of the University of Illinois.

Bulletins Nos. 13 and 19 issued by the University.

These illustrated bulletins cover the present technical facilities of the experiment station and the university and also include plans for the future.



### The Earning Power of Railroads

By Floyd W. Mundy, James H. Oliphant & Company, 61 Broadway, New York, N. Y. 422 pages.

This 1918-1919 edition continues the compiler's policy of presenting important statistics relating to the earning power and securities of steam railroads in the United States and Canada.

### Railway Statistics of the United States of America for 1917

By Slaton Thompson, Bureau of Railway News & Statistics, Chicago, Ill.

This publication is the fifteenth of a series dealing with steam railroad statistics. It presents the statistics for the year ended Dec. 31, 1917, as compared with the official reports for 1915, and it also gives recent statistics of foreign railways.

### Steam Engines

By E. M. Shealy, associate professor of steam engineering, University of Wisconsin McGraw-Hill Book Company, Inc., New York, N. Y. 290 pages. Illustrated, cloth. \$2.50 net.

This is part of the engineering education series prepared in the Extension Division of the University of Wisconsin and intended to be used as a text-book for correspondence students. It is the third of a series of three books for students pursuing a general course in steam engineering, the other two being "Steam Boilers" and "Heat." The book is practically non-mathematical in character and covers the range of topics usual in books of this class. A few pages at the end are given to the subject of steam turbines. As is necessary in a book intended for education by correspondence, the language is simple and the points made are illustrated by means of diagrams and numerical problems wherever possible.

### Rest Periods for Industrial Workers and A Case of Federal Propaganda in Our Public Schools

Two publications by the National Industrial Conference Board, 15 Beacon Street, Boston, Mass.

The first of these pamphlets constitutes Research Report No. 13 and was issued in January. It reports the experience of leading American establishments with rest pauses for the workers, especially for women, with a view of giving some idea of the extent to which systematic recesses in the day's work have been practiced in this country and also to determine broadly how far such pauses are desirable from the standpoint of health and of industrial efficiency.

The second pamphlet, which was issued in February, contains criticisms of three pamphlets issued by the United States Bureau of Education for the intermediate and upper grades of elementary schools and for high school use, entitled "Lessons in Community and National Life." Ostensibly, these lessons are for use in the presentation of social and political economics in the public schools and for casual reading by older readers, but they are held to contain bad economic reasoning and to be partisan in their character.

## Personal Mention

### Milwaukee Changes

The engineering and operating divisions of the way and structures department of the Milwaukee Electric Railway & Light Company, Milwaukee, Wis., have recently been consolidated. These were formerly operated as separate divisions. With this change E. J. Archambault has been made assistant engineer of way and structures. Mr. Archambault has been in the engineering department of the Milwaukee Company for the last seven years in charge of the civil engineering force. Mr. Charles Lederer, formerly city roadmaster, becomes assistant superintendent of way.

Col. Joseph H. Alexander, who recently returned from France, has been elected vice-president of the Cleveland (Ohio) Railway.

W. E. Jones has resigned from the Connecticut Company, New Haven, Conn., to accept a position in the accounting department of the Rhode Island Company, Providence, R. I.

H. C. Eddy, senior inspector of traffic of the Board of Public Utility Commissioners of New Jersey, recently gave an illustrated lecture, "Development of the Electric Railway," before the Engineers' Club of Trenton.

James S. Sayers, Wilmington, Del., has been appointed chief engineer for the Trenton & Mercer County Traction Corporation, Trenton, N. J. He was connected with the Trenton company some years ago, but left to accept a position in Wilmington.

Mrs. W. T. Waters, who became publicity manager of the Georgia Railway & Power Company, Atlanta, Ga., and assistant editor of *Here We Are*, published by that company, when her husband left for training camp in August, 1917, returns to peace-time life, her husband having returned ready to resume his work for the company.

Joseph A. Kellogg, Glens Falls, N. Y., has been nominated by Governor Smith for member of the Public Service Commission for the Second District to succeed Jerome L. Cheney, now a Deputy Attorney-General. Mr. Kellogg, is a former Supreme Court Justice. He conducted Governor Smith's campaign from the Syracuse headquarters of the Democratic Committee last fall.

J. G. Huntoon, general manager of the Tri-City Railway, Davenport, Iowa, has contributed an interesting and well-written article to the *Davenport Times* analyzing the part which the automobile has played in the reduced revenues of electric railways. Mr. Huntoon shows that the development of electric railway and interurban lines is at a standstill in most parts of the United States and sums up his presentation of

the subject with the statement that either increased revenues or decreased expenses must accrue to the companies if they are to provide a fair return to the investor.

R. W. Belcher has been elected secretary of the war service executive committee of the Chamber of Commerce of the United States, of which Joseph H. Defrees, Chicago, is chairman. Mr. Belcher takes up the work which was inaugurated by W. H. Manss at the great reconstruction conference, held under the auspices of the National Chamber at Atlantic City last year. For the last year and a half Mr. Belcher has been a captain in the Ordnance Department. He was secretary of the Civil Service Commission of the city of New York during the administration of Mayor Mitchel, and also served for a period as the secretary of the National Civil Service Reform League. His headquarters are at Riggs Building, Washington, D. C.

Paul Shoup, San Francisco, Cal., who had been serving as a director of the Southern Pacific Company during the unexpired term of William Sproule, now with the Railroad Administration, has been elected to the board of directors of the Southern Pacific Company for a full term. On July 11, last, Mr. Shoup was elected a director and vice-president and assistant to the president of the Southern Pacific Company. He had formerly been president of the Pacific Electric Railway. Mr. Shoup did not sever his connection with the Pacific Electric Railway, however, for he is the executive representative of the Southern Pacific Company on the Pacific Coast, with general supervision over the Pacific Electric Railway.

Edmond S. Gillette, mechanical and electrical engineer of the Aurora, Elgin & Chicago Railroad, Aurora, Ill., has resigned to become associated with the Lyon-Metallic Company at Montgomery as service engineer. Mr. Gillette has been with the Aurora, Elgin & Chicago Railroad for six years, in charge of the operating and maintenance departments. He has served as a member of the power distribution committee of the American Electric Railway Engineering Association, and chairman of the electrical engineering committee of the Illinois Electric Railway Association. He is a member of the Master Car Builders' Association. Mr. Gillette became connected with the Aurora, Elgin & Chicago Railroad following his graduation from the University of Wisconsin, where he won national honors in athletic events.

Eugene C. Clarke has resigned from the position of superintendent of instruction and efficiency of the Tacoma Railway & Power Company, Tacoma, Wash., to become associated with John



A. Beeler, consulting engineer, with New York City as headquarters. Mr. Clarke has been very successful in handling transportation department employees and securing voluntary co-operation on the part of the men. He was formerly connected with the Brooklyn Rapid Transit Company as supervisor of instruction, but his activities in Brooklyn were much wider than his title there indicated. He was one of the electric railway pioneers in the field of accident prevention. His educational work in Brooklyn in this connection attracted wide attention and was liberally drawn upon for use on other systems.

Rolla Wells, who has been appointed receiver of the United Railways, St. Louis, Mo., has long been identified with business interests in that city. Mr. Wells' father, the late Erastus Wells, operated the first city railway in St. Louis, which incidentally is said to have been the first street railway west of the Mississippi River. It was a horse car line and operated on Olive Street, from Fourth Street to about Seventeenth Street. Rolla Wells was employed by the Missouri Railway on this line, becoming assistant superintendent and later general manager. He resigned in 1879. Mr. Wells is sixty-three years old. He holds large financial interests. He served as Mayor of St. Louis from 1901 to 1908. He was chosen governor of the Federal Reserve Bank for the Eighth (St. Louis) District in 1914 and served until Jan. 1, 1919. He was graduated from Princeton University. Mr. Wells was treasurer of the Democratic National Committee during the campaign of 1912.

Nicholas J. Cunningham, for the last sixteen years executive secretary of the Springfield Gas & Electric Company and the Springfield Traction Company, Springfield, Mo., on April 8 tendered his resignation in order that he might devote himself more fully to the development of extensive holdings of oil land in McCulloch County, Tex., where he owns a large acreage. Mr. Cunningham will remain in Springfield, however, until fully relieved of his responsibilities. Notwithstanding his close application to the duties of the position which he has held with the public utility corporation, Mr. Cunningham has found time to organize and operate a number of other very successful business enterprises. Two of the city's most popular amusement places were established by Mr. Cunningham. Mr. Cunningham entered the public utility field with the Peoria Gas & Electric Company. In 1903 he went to Springfield as secretary of the Springfield Gas & Electric Company. In 1906 he brought about the consolidation of this company with the Springfield Traction Company. Since that time he has been executive secretary of both companies. Mr. Cunningham assisted in the organization of the Missouri Association of Public Utilities and was secretary of the association for six years. He was born in Peoria, Ill., and was educated there and at St. Victurs Academy, near Kankakee, Ill.

## Obituary

### A. B. du Pont Dead

Antoine B. du Pont, electric railway expert, inventor, engineer and the man who first managed the street railway system in Cleveland, Ohio, under the 3-cent fare plan of the late Mayor Tom L. Johnson, died of pneumonia on April 11 at his residence in Cleveland, Ohio.

Mr. du Pont is perhaps best remembered in Ohio as the close associate of Tom Johnson in Cleveland. This was because there attached to Mr. du Pont's work in this connection much that was spectacular, necessarily so but not because Mr. du Pont would have had it so. However, his Cleveland experience played only a small part in Mr. du Pont's career in the electric railway field, in which he early earned for himself a reputation for ability. Thus among his notable works were his many patents, among them the du Pont truck, and the task he performed as a member of the Traction Valuation Commission, which fixed the valuation of the Chicago railway properties for the 1907 settlement ordinances.

Mr. du Pont was born in Louisville, Ky., on April 20, 1865. His uncle, A. V. du Pont, was the chief owner of the old Louisville Railway, and his father, Bidermann du Pont, was largely interested there. Mr. du Pont was graduated from the Rensselaer Polytechnic Institute at Troy, N. Y., at twenty-one. He first tried his hand as a coal mine engineer, but wanted to get into railroad-ing. He then returned to Louisville and worked in the track department of the Louisville Railway on construction and maintenance. Later he was invited to join forces with Tom L. Johnson in Brooklyn, N. Y. Subsequently he rejoined Mr. Johnson in Detroit and electrified one of Detroit's systems. When all the lines in Detroit were consolidated Mr. du Pont became general manager. Mr. du Pont's reputation for getting things done had now been firmly established, and he was invited to St. Louis. As vice-president and general manager of the St. Louis Transit Company he tore out the cable lines and put in electricity. While he was engaged in this work he found time to design and install the great terminals to handle the world's fair crowds. He went to Cleveland as a volunteer and plunged into the struggle in the 3-cent fare fight. A characteristic remark attributed to him was to the effect that there was more music to his ears in the fare register than there was in the stock ticker. To him, it was the folks who pay the fares, not the brokers, that made street railroads.

His wife, who was Miss Elizabeth C. Hibbs, assistant secretary to Tom L. Johnson, three daughters and a son survive him. Mr. du Pont also is survived by two brothers, T. Coleman du Pont, New York, former president of

the E. I. du Pont de Nemours Powder Company, Wilmington, Del., and E. M. du Pont, president of the Johnstown (Pa.) Traction Company.

Col. Robert Andrews, president of the Safety Car Heating & Lighting Company, New York, N. Y., from 1889 to 1908, died on April 7 at the age of eighty-four years.

Col. James I. Baird, eighty-nine years old, civil engineer of national note, died at Detroit, Mich., on April 6. Colonel Baird supervised the construction of the Lake Street Elevated Railroad, Chicago, now known as the Chicago & Oak Park Elevated Railway.

H. E. Crawford, president of the Windsor, Essex & Lake Shore Rapid Railway, Kingville, Ont., is dead. He had been in poor health for some time. Before removing to Chatham in 1915 Mr. Crawford was in the store business in Tilbury for many years.

### Favors M. O. on Reasonable Basis

Roger Mills, secretary and manager of the Sioux Falls (S. D.) Traction System, which is owned and controlled by the Mills family, is one of those aware of the unmistakable tendency toward cities extending their sphere of influence over utilities and other activities that affect directly the life and habits of the vast majority of the people. He even sees in municipal ownership of street railways a greater means of growth and prosperity for cities than through the city owning any other utility. The *Daily Argus Leader*, Sioux Falls, S. D., quotes Mr. Mills in part as follows:

In a great many ways city ownership of the electric railway would mean more to the growth and prosperity of the city than the owning of any other utility. It is only natural that conflicts should arise between the city and the corporation over how the streets are to be used and maintained. The city can go ahead with a street paving program and not expect the electric railway to put thousands of dollars into paving which is really a detriment to business, decreases the patronage and causes high maintenance and renewal charges. Under city ownership there would be no conflict over paving questions. When a street was ordered paved, the car tracks could be paved at the same time, by the same contractor and in any manner that the property owners desired.

There is a crying need in Sioux Falls right now for new lines. With the present prospects of heavy pavement charges it is doubtful if we could undertake to build any of these lines. Failure to extend is going to hamper the growth and development of the city, but it is unfair to ask or expect us to construct these additional lines and then be forced to pay \$10,000 or \$12,000 a mile to pave them. I say to you frankly that we are not contemplating any new lines or extensions.

In addition to building more lines it would be possible under city ownership to give more frequent service, as there would be no difficulty in the city securing ample funds for this purpose and at a lower interest charge than we are compelled to pay. Rates of fare could also be lowered and placed on a service-at-cost basis, if though desirable, which would greatly increase the patronage.

We do not have to sell or turn the road over to the city unless we want to. If the city is going to try to take away from us something we have created without giving just compensation, then we are opposed to and will try and obstruct city ownership of the electric railway. On the other hand, if it is for the best interests of the city to own the road, and the city will treat fairly with us, making satisfactory allowance for the unexpired time under the franchise, then we would be willing to negotiate.



# Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER,

SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES

BUSINESS ANNOUNCEMENTS

## Coal Stocks Low Under Short Production

**Accumulation of Stocks During Summer by Power Companies Would Help Relieve Shortage Which Will Appear This Fall**

The coal market at the present time shows little activity. Production of bituminous coal is now approximately 25 per cent below the production of the corresponding week of 1918, and production of anthracite coal is approximately 50 per cent below that of the same period last year. Anthracite producers are operating two and three days a week. Stocks of coal above ground are not very great. Buyers are holding off, individual stocks are diminishing and everybody seems to be waiting for something to happen. The result will be, coal interests believe, that when buying starts it will start with a bang and the fortunate ones will be those whose orders are filled, while the rest wait for stocks to build up sufficient in size to supply them.

The railroads take approximately 25 per cent of the coal mined per year for locomotive use. Power stations for utility purposes take approximately the same amount. Hence the importance of the railway power house in the coal market. Utility companies had laid in considerable stock of coal under rather high prices and some of that stock is still reported on hand. In some cases this coal is being used with no measure for restocking for reserve purposes. Again, other utilities' operators are leaving their old stocks as reserve and are purchasing from month to month merely sufficient quantities to carry them through. Small quantities, sufficient to carry many a company for a month, may be purchased for about 50 cents per ton under the price set by the Fuel Administration. This price can as a rule, however, be obtained from only the smaller coal producers. The large producers are holding practically to the price set by the Fuel Administration, although that body really passed out of control early this year.

The price of anthracite coal will increase 10 cents a ton per month from now on till 50 cents is added, but there is no indication as to what the price may be when the rush of buying is under way. This rush is sure to come, following the procedure of the buying public in holding off with its orders. The state of the coal market next fall will be the answer to the present quiet condition of that market. Many coal operators claim there will be a runaway coal market this fall and winter unless

more interest than at present is shown in summer stocking.

Bids on the supply of coal for the season are being withheld on account of the uncertain market and the basing of prices on federal regulations in effect last fall. Coal operators believe they will have labor troubles when the present wage agreement runs out, and are refusing long contracts except at top prices. After 1919, anthracite miners will have a documentary claim on a demand for higher wages, but as to whether or not they will have a moral claim remains to be seen. The Department of Labor is not making any easier any possibility of a reduction in wages, and any attempt on the part of operators to that end is liable to lead to serious difficulties.

Bituminous mines are on a forty-eight hour basis, and there is evidence in the wind of an effort to be made to reduce those hours to five days of six hours each. The pay would not only be the same for some of those affected by this proposed week of thirty hours but further effort would be made to even increase this wage on the part of a certain class of the men.

From one region, however, there is a report that the executive of the state in which that region is located has set himself against any reduction in wages. A meeting of the miners provides the information that were it not for this assurance given them in the upholding of their wages, there might have been a division in their ranks when the question of a reduction should come up. This is merely one evidence of a possible susceptibility on the part of some miners to accept a possible reduction.

A short time ago the price of coal nearly underwent a further increase of 50 cents. Had this been accomplished there would now be more possibility of looking for a reduction. A considerable deterrent to an increase in price the last of this year will be brought into play if more attention is paid to the increasing of stocks this summer.

## Trolley Wire Market Showing Slightly Increased Activity

There is an increased movement in bare trolley wire noted in some sections of the country. This movement, however, is practically only for replacements and repair. In certain cases where particularly heavy traffic conditions and mechanical strains are more apparent, cable of a different fabrication than bare copper is finding considerable activity in lengths of about a mile and slightly over. This is true especially in the Southern cities.

## Activity in Special Work Renewals

**Fred Bland, Director of Tramway Department of Edgar Allen & Company, Sees Active Business Ahead**

In a discussion on special track work conditions in the United Kingdom on Feb. 21 at the plant of Edgar Allen & Company, Ltd., Sheffield, England, Fred Bland, director of the tramway department, expressed himself in optimistic vein on the future of electric railway special work. During the preceding week, Mr. Bland said, more worth-while inquiries had come in than during any single week since the opening of the war. If the tramways realized that there was no prospect of an early reduction in the cost of manganese track work in sight, orders would soon be brisk. There was no likelihood that solid manganese would decline in popularity although a few undertakings were using cast steel and others were considering built up work, and even considering the return of short switches because of the cost, still the demand for manganese would be the same in some form or other. Manchester and Glasgow were the two large cities where insert construction was a standard along with manganese, which, however, was becoming the greater of the two. He certainly would favor a cut in prices if that were possible, but labor was higher than ever, and manganese was going up instead of going down.

During the war, hardly one-fifth of the tramways department staff had remained with the company, while the government had requisitioned the buildings used for assembling and fitting pieces before shipment. Now, as the track specialists were drifting back from war service and their facilities in manufacture were being restored, Mr. Bland said that his company was ready for anything. Even if the company had been permitted to keep its full staff, it would have been of no avail because for a long time no tramway was allowed to order any track work without a permit, at first from the Ministry of Munitions (Priority Department) and later by the Tramways (Board of Trade) Committee testifying that such work was necessary. Now this committee has finished, and orders are free to come along, and priority of ordering would be an important feature in delivery promises.

It was obvious therefore, that the need for replacements was urgent. Outside the oxy-acetylene welding little



else had been done by the tramways themselves to keep going, concluded Mr. Bland.

## Sale of the British Westinghouse Holdings

**Chairman Tripp, Returning from England, Announces Sale of Interests and New Commercial Alliance**

Gen. Guy E. Tripp, chairman of the board of the Westinghouse Electric & Manufacturing Company, returned to New York recently from a trip to England. He said that the British interests have practically been sold.

"Subject to the successful accomplishment of certain legal details in Europe, which, however, may be waived by the Westinghouse company if thought desirable," said General Tripp, "an agreement has been reached with certain important British interests under which the Westinghouse company sells for cash its British holdings and enters into a commercial alliance looking to the development of export business.

"The commercial plan will be instituted immediately upon the assumption that the whole deal will be consummated on one of the bases above indicated. No further details can be given out at this time."

General Tripp believes that foreign trade prospects depend on the successful outcome of the peace conference. Some method of international financing to provide for the obligations growing out of the war must be formed, he declared, before normal commercial conditions can be expected.

## Rolling Stock

Quincy (Ill.) Railway expects to install a number of new cars of the latest type and one rotary snow sweeper. The service also will be improved and better schedules arranged.

Washington Railway & Electric Company, Washington, D. C., which lost thirty-one cars and its Eckington car-house in a fire, as noted in these columns of March 1, is holding up the replacement of these cars, it is reported. It is probable that this is due to the considerable outlay necessary for this replacement.

Springfield (Ill.) Consolidated Railway, through A. D. Mackie, general manager, has notified the City Commission that the operation of one-man cars will be a necessity in order to keep the company out of the hands of a receiver. The company has had its fare increased from 5 cents to 6 cents and says that further increases are out of the question.

## Franchises

Detroit, Mich.—Henry Ford has applied for franchises to establish a system of street railways in the townships of Springwells, Ecorse and Dearborn and the village of Oakwood, connecting the Ford blast furnaces, shipyard and tractor plant.

East St. Louis, Ill.—The East St. Louis & Interurban Electric Railway has asked the City Council of East St.

Louis for a franchise to construct a line and operate cars in East St. Louis. The proposed route of the line will extend from Tenth and Market Streets to the Free Bridge.

## Track and Roadway

Fort Madison (Iowa) Street Railway.—This company reports that it will reconstruct approximately 3300 ft. of single track.

Berkshire Street Railway, Pittsfield, Mass.—The Berkshire Street Railway has begun to dismantle its 7-mile line between Lanesboro and Cheshire, which has been closed to traffic since early in January, 1918.

Kansas City (Mo.) Railways.—Plans are being contemplated for the construction of an extension of the Independence cross-town line of the Kansas City Railways from the present northern terminus at Liberty and Moore Streets to Sugar Creek, about 2½ miles, this summer. P. J. Kealy, president of the company, has accepted a proposition of the business men of Independence to loan the company \$50,000 for ten years at 6 per cent interest, the proceeds of the loan to be used in building the new line.

Interborough Rapid Transit Company, New York, N. Y.—Operation of trains through the new Clark Street tunnel has been begun by the Interborough Rapid Transit Company. The new service enables passengers on the West Side line to travel direct to Brooklyn without changing to the shuttle or transferring.

## NEW YORK METAL MARKET PRICES

	Apr. 3	Apr. 17
Copper, ingots, cents per lb.	15 50	15 37½
Copper wire base, cents per lb.	17.25 to 18.00	17.25 to 18.00
Lead, cents per lb.	5.25	5 00
Nickel, cents per lb.	40	40.00
Spelter, cents per lb.	6.62½	6.45
Tin, cents per lb.	172.50	172.50
Aluminum, 98 to 99 per cent, cents per lb.	30.00	31.00

† Government price in 25-ton lots or more f.o.b. plant.

## OLD METAL PRICES—NEW YORK

	Apr. 3	Apr. 17
Heavy copper, cents per lb.	13 00 to 13.25	13.50 to 13.75
Light copper, cents per lb.	10.50 to 11.00	11.00 to 11.25
Heavy brass, cents per lb.	7.25 to 7.50	7.50 to 8.00
Zinc, cents per lb.	5.25 to 5.50	5.25 to 5.50
Yellow brass, cents per lb.	6.00 to 6.50	6.50 to 7.00
Lead, heavy, cents per lb.	4.25 to 4.50	4.00 to 4.25
Steel car axles, Chicago, per net ton.	\$26 00 to \$28 00	\$26.00 to \$28.00
Old carwheels, Chicago, per gross ton.	\$22 00 to \$23 00	\$22.00 to \$23.00
Steel rails (scrap), Chicago, per gross ton.	\$17 00 to \$17 50	\$17.00 to \$17.50
Steel rails (relaying), Chicago, gross ton.	\$16 50 to \$17 00	\$17.00 to \$17.50
Machine shop turnings, Chicago, net ton.	\$6 50 to \$6 00	\$7.50 to \$7.00

## ELECTRIC RAILWAY MATERIAL PRICES

	Apr. 3	Apr. 17
Rubber-covered wire base, New York, cents per lb.	20	20
Weatherproof wire (100 lb. lots), cents per lb., New York.	24 25	23.00
Weatherproof wire (100 lb. lots), cents per lb., Chicago	23 75 to 37.35	23.75 to 37.35
T rails (A. S. C. E. standard), per gross ton.	\$49 00 to \$51 00	49.00 to 51.00
T rails (A. S. C. E. standard), 20 to 500 ton lots, per gross ton.	\$47 00 to \$49 00	47.00 to 49.00
T rails (A. S. C. E. standard), 500 ton lots, per gross ton.	\$45 00 to \$47 00	45.00 to 47.00
T rail, high (Shanghai), cents per lb.	3	3
Rails, girder (grooved), cents per lb.	3.75	3.75
Wire nails, Pittsburgh, cents per lb.	3½	3.25
Railroad spikes, drive, Pittsburgh base, cents per lb.	3 25	3.25
Railroad spikes, screw, Pittsburgh base, cents per lb.	8	8
Tie plates (flat type), cents per lb.	2.75	2.75
Tie plates (brace type), cents per lb.	2.75	2.75
Tie rods, Pittsburgh base, cents per lb.	7	7
Fish plates, cents per lb.	3	3
Angle plates, cents per lb.	2.75	2.75
Angle bars, cents per lb.	3	3
Rail bolts and nuts, Pittsburgh base, cents per lb.	4 35	4.35
Steel bars, Pittsburgh, cents per lb.	2 35	2.35
Sheet iron, black (24 gage), Pittsburgh, cents per lb.	4 20	4.20
Sheet iron, galvanized (24 gage), Pittsburgh, cents per lb.	5 25	5.25
Galvanized barbed wire, Pittsburgh, cents per lb.	4 10	4.10

	Apr. 3	Apr. 17
Galvanized wire, ordinary, Pittsburgh, cents per lb.	3.70	3.70
Car window glass (single strength), first three brackets, A quality, New York, discount.	80%	80%
Car window glass (single strength), first three brackets, B quality, New York, discount.	80%	80%
Car window glass (double strength, all sizes AA quality), New York discount.	81%	81%
Waste, wool (according to grade), cents per lb.	14 to 17	14 to 17
Waste cotton (100 lb. bale) cents per lb.	8 to 13½	8 to 13½
Asphalt, hot (150 tons minimum) per ton delivered.	.....	.....
Asphalt, cold (150 tons minimum, pkgs. weighed in, F. O. B. plant, Maurer, N. J.), per ton.	.....	.....
Asphalt filler, per ton.	.....	.....
Cement (carload lots), New York, per bbl.	\$2.90	\$2.90
Cement (carload lots), Chicago, per bbl.	\$3.05	\$3.05
Cement (carload lots), Seattle, per bbl.	\$3.13	\$3.13
Linseed oil (raw, 5 bbl. lots), New York, per gal.	\$1.53	\$1.53
Linseed oil (boiled, 5 bbl. lots), New York, per gal.	\$1.60	\$1.63
White lead (100 lb. keg), New York, cents per lb.	13	13
Turpentine (bbl. lots), New York, cents per gal.	69½	78

† These prices are f. o. b. works, with boxing charges extra.



**New York State Railways, Rochester, N. Y.**—Construction will be begun soon by the New York State Railways on an extension from Dominick Street, Rome, through Carey Street to the Y. M. C. A. building at the Rome Brass & Copper Company's plant.

**Geneva, Seneca Falls & Auburn Railroad, Seneca Falls, N. Y.**—The Public Service Commission for the Second District of New York today passed an order directing the Geneva, Seneca Falls & Auburn Railroad to extend its track from its present terminus in Cayuga Lake Park 150 ft. easterly and that it erect at the new terminus a suitable shelter for waiting passengers. The company is also to provide and maintain a safe and convenient pathway from the new terminus to the Lake road at the foot of the hill on the shore of Cayuga Lake, properly lighted when cars are operated during the night.

**Tulsa (Okla.) Street Railway.**—Double tracking is now being laid by the Tulsa Street Railway from North Main and Cameron to North Cheyenne and Duluth Streets.

**St. Thomas (Ont.) Municipal Street Railway.**—The ratepayers of St. Thomas will be asked to vote on a by-law for the issue of debentures for \$50,000 for street railway improvements, including the reconstruction of the Talbot Street line, improving the carhouse, remodeling of cars and the purchase of new equipment.

**Portland & Oregon City Railway, Portland, Ore.**—It is reported that the Portland & Oregon City Railway will construct a 12-mile extension of its line to tap the Sand-Hayden and Cornwell timber tracts.

**Dallas (Tex.) Railway.**—The City Commissioners of Dallas have passed an order directing the Dallas Railway to begin at an early date the construction of a new single track line on Myrtle Street from Colonial Avenue to the Oakland Cemetery south of Dallas. Prior to the passage of the order, J. F. Strickland, president of the company, signed an agreement with the City Commission to begin work on this extension by Sept. 1, 1919, and to complete the line by Jan. 1, 1920.

**Houston (Tex.) Electric Company.**—The City Council of Houston has issued an order directing the Houston Electric Company to lower its tracks on Washington Avenue between Bethne Street and Houston Heights Boulevard. The order also directs the company to pave that portion of the street under and between its tracks. The work will cost approximately \$60,000.

**Richmond & Ashland Railway, Richmond Va.**—Announcement has been made by Oliver J. Sands, head of a citizens' committee, that he and his associates have accepted the offer of George Taylor, representative of the Gould interests, to sell the property of the Richmond & Chesapeake Railway from Richmond to Ashland. It is understood that service will be resumed at once.

**Seattle (Wash.) Municipal Street Railway.**—Thos. F. Murphine, Superintendent of Public Utilities, in a recent communication to the city utilities committee, asked authority to spend approximately \$200,000 in betterments to the municipal street railway system. The work contemplated will connect the recently acquired traction system and the other municipal lines, and facilitate the handling of traffic in the congested districts. The proposed betterments include: connection of Division A with traction line at Third Avenue and Pine Street, 15th Avenue bridge connections, connection of the two systems at 24th Avenue N. W. and West 67th Street, connection of Division A and Westlake Avenue lines, connection of Division A and North Seattle car barns, Leary Avenue construction, Ballard Avenue and Market Street lines, and Avalon Way double tracks.

### Power Houses, Shops and Buildings

**Quincy (Ill.) Railway.**—New machinery will be installed by the Quincy Railway at its power house to permit the use of Keokuk power and to permit the steam plant to stand idle, ready for emergencies. Four new feed wires will be run from the power house to various parts of the system.

**Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ind.**—A new one-story and two-story car repair shop, 60 ft. x 190 ft. will be constructed by the Terre Haute, Indianapolis & Eastern Traction Company on East Wabash Avenue, Terre Haute.

**Interborough Rapid Transit Company, New York, N. Y.**—The Public Service Commission for the First District of New York has closed a contract with the officers of the New York Catholic Protectorate under which the Commission will obtain for a consideration of \$75,000 a plot of approximately 12 acres between the foot of Herschel Street and Westchester Creek, Unionport, to be used as a storage yard for the Pelham Bay Park branch of the Lexington Avenue Subway. It is hoped to close title shortly so that construction of the yard can begin at an early date, and be completed by or about the time the elevated portion of the Pelham Bay Park branch, for which bids were received by the Commission a few days ago, is completed. The site is estimated as sufficient to accommodate more than thirty trains of Interborough Rapid Transit Company's steel cars. Space will also be provided for the storage of materials.

**Kansas City, Mo.**—The Halpin Dwyer Construction Company has begun grading the site of the new interurban terminal at Tenth and McGee Streets.

**Lima Electric Railway & Light Company, Lima, Ohio.**—It is reported that the Lima Electric Railway & Light Company, which is controlled by the Ohio Electric Railway, plans the construction of a large power plant.

### Trade Notes

**J. F. Davis, Chicago, Ill.**, has recently purchased and is offering for resale a large number of boilers from the Du Pont Powder Company's plant. The aggregate cost is said to be in the neighborhood of \$500,000.

**Chicago (Ill.) Pneumatic Tool Company** has moved its Milwaukee office from Room 1305 Majestic Building to Room 1418 in the same building, where more convenient quarters which are necessitated by the constantly growing business of the company in this district have been obtained.

**Bailey Meter Company, Cleveland, Ohio**, will move its main office and works from Boston, Mass., to Cleveland, Ohio, effective May 1. The Boston office, with H. D. Fisher as manager, is retained to handle sales and engineering service work in the New England district. For the present New York and Philadelphia districts will be covered from Boston and all other districts will be covered from Cleveland.

**Economy Electric Devices Company, Chicago, Ill.**, reports that the Seattle Municipal Railway has ordered 251 more Economy power saving railway meters. This order is in addition to the present equipment, installed last summer on the one-man cars of the Municipal Railway. This last order was placed through the Burton R. Stare Company, Seattle agent for the Economy Electric Devices Company.

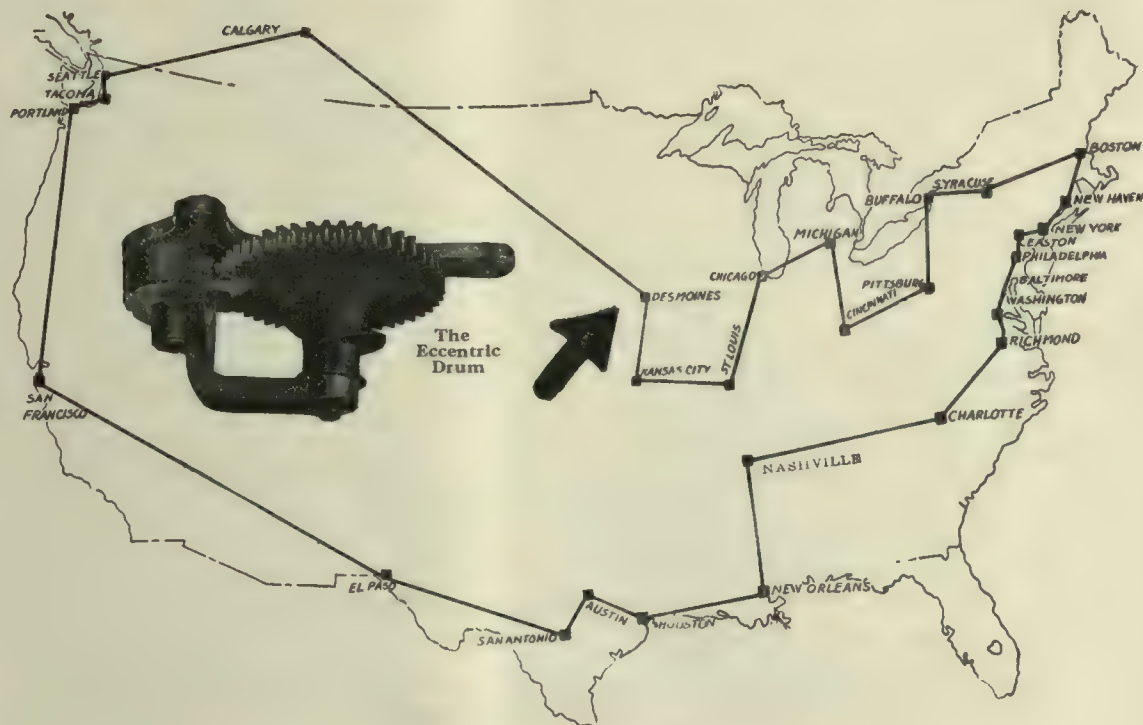
**Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., Changes.**—Capt. N. H. Callard, who has been discharged from government service is appointed to the railway sales department in the capacity of commercial engineer. W. Keith McAfee has been transferred to the service department as railway engineer. F. D. Kennedy is appointed superintendent of the railway department of the works.

**Liberty Steel Products Company Inc., Chicago, Ill.**, announces the appointment of J. M. Borrowdale as sales representative in the railroad department with office at 1901 McCormick Building, Chicago. Mr. Borrowdale was formerly superintendent of car department of the Illinois Central Railroad and for the past two years has been connected with Johns-Manville Company as sales representative in their railroad department.

**Daniel T. Pierce**, formerly assistant to the president of the General Asphalt Company, and at one time assistant to the president of the Philadelphia Rapid Transit Company, has just returned from more than a year's service with the Red Cross in France. Mr. Pierce is located temporarily at Room 1031, 120 Broadway, New York, and will represent in this country important Franco-Italian interests as well as act for American manufacturers seeking business in France and other European countries.



# Peacock Brakes from Coast to Coast



## Des Moines Uses 240 Peacock Brakes

Des Moines is another city which has learned, from long and broad experience, that the Peacock is not only a *safe brake*, but a brake that minimizes money-wasting turnbacks.

The big city railways are confronted by a much greater need of safe, economical brakes than the smaller roads. They run through more congested traffic, are subject to a higher cost per accident, and must needs maintain faster, closer schedules.

When such systems adopt the Peacock Brake as matter-of-course insurance for their cars, whether tiny storage battery or massive multiple unit, there is no room for doubting that it pays to prefer the Peacock Brake in either standby or continuous service.

*Next Stop*—KANSAS CITY

**National Brake Co.**  
Buffalo, N. Y.



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prices, a mention of the Electric Railway  
Journal would be appreciated.

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Electrical, Photometrical and  
Mechanical Testing.

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**Scofield Engineering Co.** Consulting Engineers  
PHILADELPHIA, PA.  
POWER STATIONS GAS WORKS  
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## HUDSON TERMINAL-30 CHURCH STREET, NEW YORK

*Manufacturers of Steel Structures of all classes  
particularly BRIDGES AND BUILDINGS*

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Buffalo, N. Y. . . . Marine National Bank  
Cincinnati, Ohio . . . Union Trust Building  
Atlanta, Ga. . . . Candler Building  
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Denver, Colo. . . . First National Bank Building  
Salt Lake City, Utah . . . Walker Bank Building  
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### Pacific Coast Representative:

U. S. Steel Products Co., Pacific Coast Dept.  
San Francisco, Cal. . . . Rialto Building  
Portland, Ore. . . . Selling Building  
Seattle, Wash. . . . 4th Ave. So., Cor. Conn. St.

Export Representative: United States Steel Products Co., 30 Church St., N. Y.

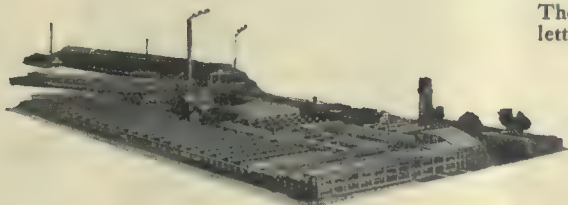
## The Building of Cars Surely Requires The Use of Rome Electric Wires

**T**HERE'S every type of wire for electric railway service from that used in the building of cars to that used in the transmission of power—trolley wires, feeder wires, etc.—all made under the one roof—no scattered plants, and supervision—no division of responsibility and energy—every operation in the making of Rome Wires, from the wire bar to the finished product is performed right "under the nose" of every officer of the company.

And we have set a standard which we must maintain without boosting the price.

You are sure of uniform wire—correct in every respect—in reality a high-class product with a low-kept price.

There's an officer of the company ready to give your letters or orders his personal attention. Write today.



**Rome**  
**Wire Company**  
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*All operations from wire bar to finished product in this plant.*



# If

you believe that the electric railway industry is doomed—and that Americans will be satisfied without street and interurban cars—

# And

if you are now manufacturing anything to be sold to electric railway companies

## Your best move

is to get into some other line of business.

## Of course

If you think that we shall continue to have electric railways and therefore intend to stay in business, you will

## Safeguard your business future

Successful business heads in all industries testify that continuous advertising is the cheapest and best business insurance.

In the electric railway field the most successful manufacturers are those who use *Electric Railway Journal* to carry their messages to the field.

The Electric Railway Journal covers all departments of the industry,—north, east, south and west. Circulation figures open to all and backed by A. B. C. statements.

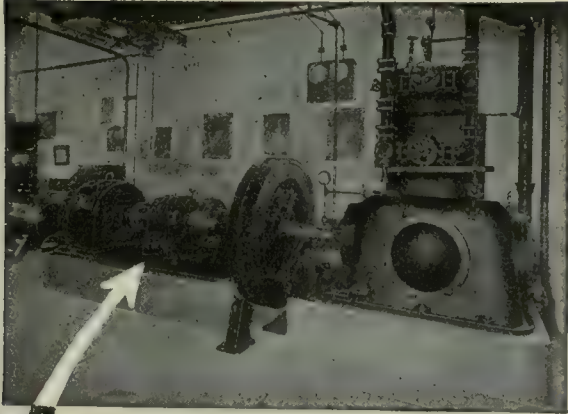
## Electric Railway Journal

Member Audit Bureau of Circulations

Tenth Ave. at 36th St., New York



# The Off-Peak Load Spells P-R-O-F-I-T-S



FOR instance, an ammonia compressor may be run, as shown in the illustration, and ice may be sold as a by-product of the electric railway power station.

And TURBO GEAR solves the power transmission problem. Note these facts:

Speed of motor.....1200 r.p.m.

Speed of compressor 150 r.p.m.

Power transmitted. 75 H.P.

Speed reduction.... 8 to 1

Efficiency..... 98%-99%

Note also the small floor space required, that high speed and low speed shafts lie in the same straight line, and that there are no exposed gears, no belts, no chains, pulleys or sprockets.

The first cost and installation cost are both low.

*Bulletin 201 tells the story.*

## The Poole Engineering & Machine Company

Manufacturers of Gears and Power Transmission Machinery Since 1843

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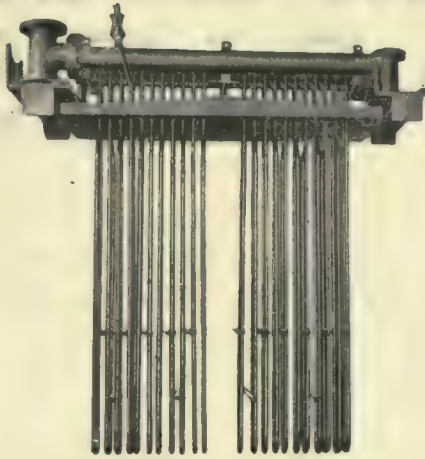
# TURBOGEAR

FAST

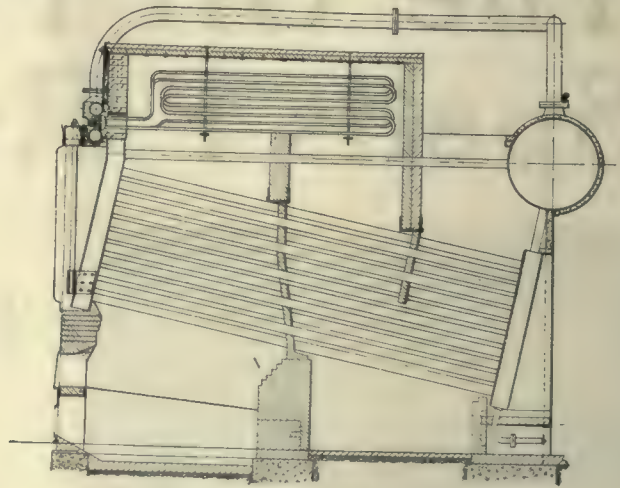
PATENTS



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The Elesco Superheater



A Typical Installation

## Meeting the Conditions In Your Plant

The most certain way to profit by using superheated steam is to get right down into actual operating conditions in your plant.

No two plants offer the same conditions. The solution of your problem, therefore, should be worked out from the actual individual factors present. These factors must be thoroughly known and fully appreciated.

A superheater to meet your plant conditions should be more than a correct design, it must give you the highest practical advantages of superheated steam under all possible operating conditions.

The Elesco Superheater is adaptable to your conditions and may be correctly applied if you will allow our engineering staff to study your conditions. They will cheerfully work with you.

*Bulletin BT-1 contains valuable information. Write for it.*

## LOCOMOTIVE SUPERHEATER CO.

*Designing Engineers and Manufacturers of Steam Superheaters for All Purposes*

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To be *sure* he is on the right course, a safe course, is the sea-captain's first concern. To be *sure* of your equipment is yours.

You can depend upon the "FRANKLIN" Disconnecting Switch with "FRANKLIN" Positive Lock to keep the circuit closed as long as you want it closed. No expulsion strain can throw out the blade, for the close-locked jaws can swing open only in a direction *opposite* to that of the resultant force. They form a complete bridge above the blade.

Yet an easy pull from any angle, with any hook, opens the jaws and releases the blade in a single continuous motion.

One push closes the switch. As the blade slips home, the jaws click shut above it.

Write for Bulletin No. 1250.

Besides Disconnecting Switches, "Franklin" Generating Station Equipment includes Post Type Insulators, Pot-heads, Doors for Bus and Switch Compartments, Instrument Cutout Switches, Cleat Type Insulators, Air Pressure Relays, etc., etc. Write for descriptive Bulletins.

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"Install the 'FRANKLIN' and Forget It"



# "FRANKLIN"

GENERATING STATION EQUIPMENT



# Greatly Increased Mileage from each Journal Box Packing



## Operation

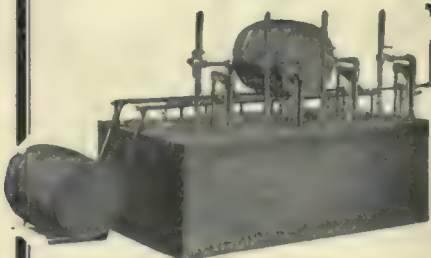
Referring to the accompanying cut. The oil is kept in the lower compartment and the upper compartment is filled with waste. The oil is then drawn from the lower compartment by means of the pump, and the waste is completely submerged. It is left saturating for 18 or 24 hours. The handle (b) is then turned and the oil drains to the screen (d) and back to the lower compartment thru the valve (c). After the waste has drained for about 24 hours it has reached a degree of perfect saturation which means 100% more mileage. The removable gauge stick (a) shows the quantity of oil in the lower compartment. The opening (e) is for cleaning or inspection.

## By using the Milwaukee Waste Saturation System

you can avoid the troublesome and costly hot box and realize 10 to 15 thousand miles on a single journal box packing, at a substantial saving of oil.

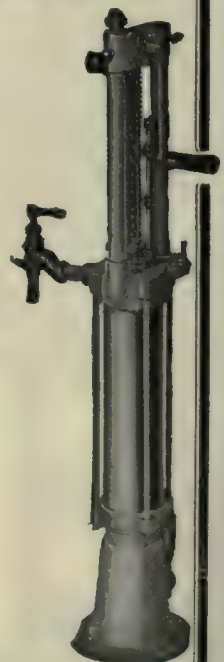
Constant lubrication is assured by the method of saturating the waste. Thorough lubrication makes possible a saving of at least one-third on journal box maintenance.

## Milwaukee Outfits Cut Your Oil and Labor Expense



We manufacture 30 different types of outfits for the economical storage and handling of such liquids as machine oils, cutting oils, kerosene, gasoline, etc. A Milwaukee Outfit will save you from 5 to 10 gallons of liquid on every barrel you use. Write for our catalog of complete oil storage systems for Railways.

**Milwaukee Tank Works**  
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PLANT OF BOSTON ELEVATED RAILWAY COMPANY

## One Terry Went in in 1909— Now They Have 25

The experience of the Boston Elevated Railway Company with Terry Turbines should "strike home" to officials of other traction companies.

The first Terry was connected up to a hot well pump at the Dorchester Station in January, 1909. It is still in operation. The cost for repairs since that time has averaged less than a dollar a year. Little attention is required. Absolute reliability of service is assured.

The Boston Elevated Railway Company now has 25 Terrys driving forced draft fans, exciter and station lighting generators, hot well, low service and fire pumps. A detailed description of the Terry Turbine and additional applications is given in bulletin 2414. Read it and learn why so many engineers advise

*Specify Terry for Driving Your Auxiliaries*

**The Terry Steam Turbine Co.**

**Terry Square, Hartford, Conn.**

# TERRY TURBINE DRIVE



# A NEW



# FEATURE

## *In Renewable Fuses*

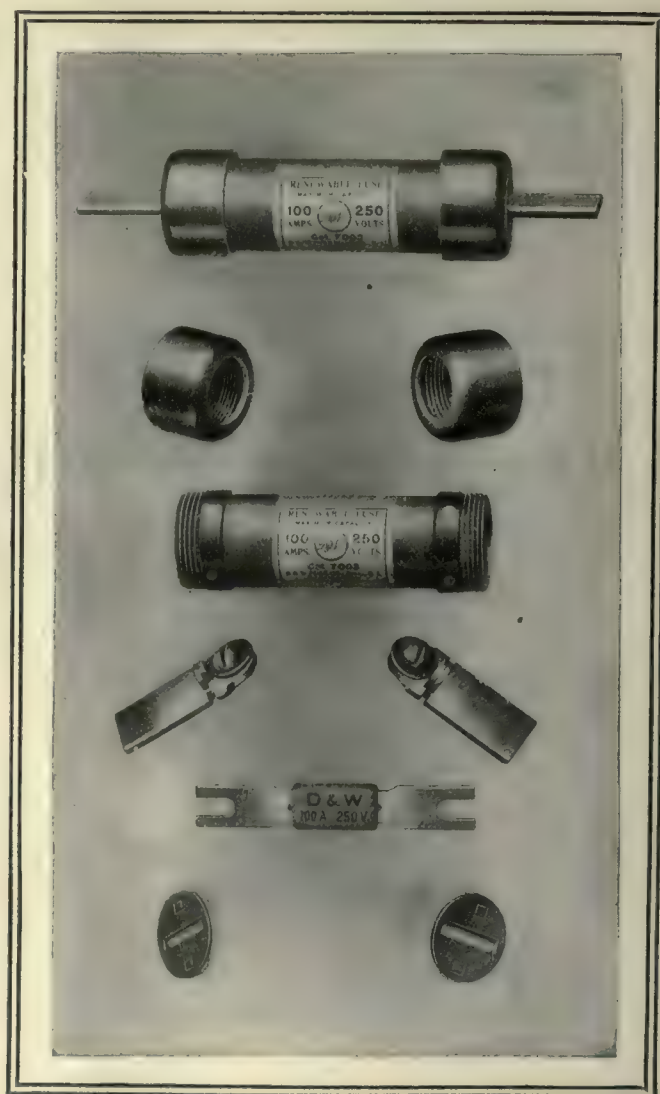
### THE EXPULSION or "JACKETED" LINK

The Expulsion or "Jacketed" Fuse Link consists of a flat strip of metal with the central portion slotted and closely wrapped with a covering of specially treated asbestos.

As the metal is burned back toward the terminals the jacket drops out, thus breaking up mechanically any strata of vaporized gas which might extend from one terminal of the burning link to the other, thereby positively opening the circuit.

This "Jacketed" Link, by its expulsion action, greatly reduces the arc and insures longer life to the casing.

**"D & W" Renewable Fuses with the "Expulsion" or "Jacketed" Fuse Links will meet the extreme short circuit tests imposed by the Underwriters' Laboratories, Inc., which subject one fuse at a time to full rated voltage at 10,000 amperes.**



*For Complete Description Send for the  
Supplement to Catalogue No. 16*

**D & W Fuse Company**  
Providence R.I.

**U. S. A.**



# TOLEDO CRANES



## In the tremendous rush for new business

that is due *now*, the Electric Railway field faces the problem of keeping pace with the increasing demands. The swift distribution of workers in *new* and *renewed* factories all over the country creates fresh transportation peaks—and behind the cars on the line must be found the most efficient methods and equipment for *handling* in the power and car house. Toledo Cranes can be depended upon to more than meet the emergency.

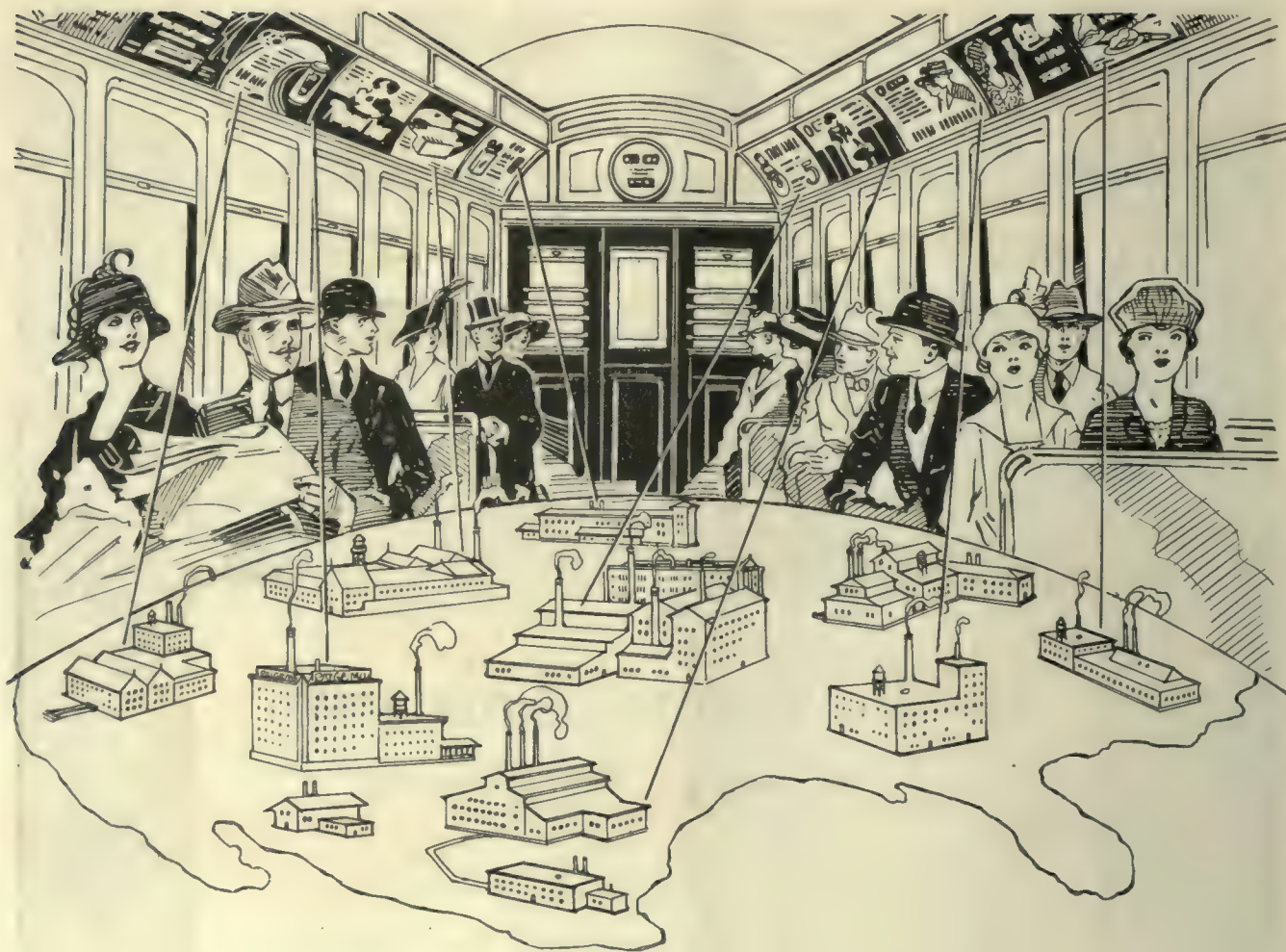
### **The Toledo Bridge & Crane Co.**

Toledo, Ohio

New York Office, 52 Broadway  
Philadelphia Office, 2013 Market St.  
Pittsburgh Office, 203 Oliver Bldg.

Cleveland Office, 725 Citizens Bldg.  
Chicago Office, 549 Washington Blvd.  
San Francisco Office, Rialto Bldg.  
Buffalo Office, 610 Iroquois Bldg.





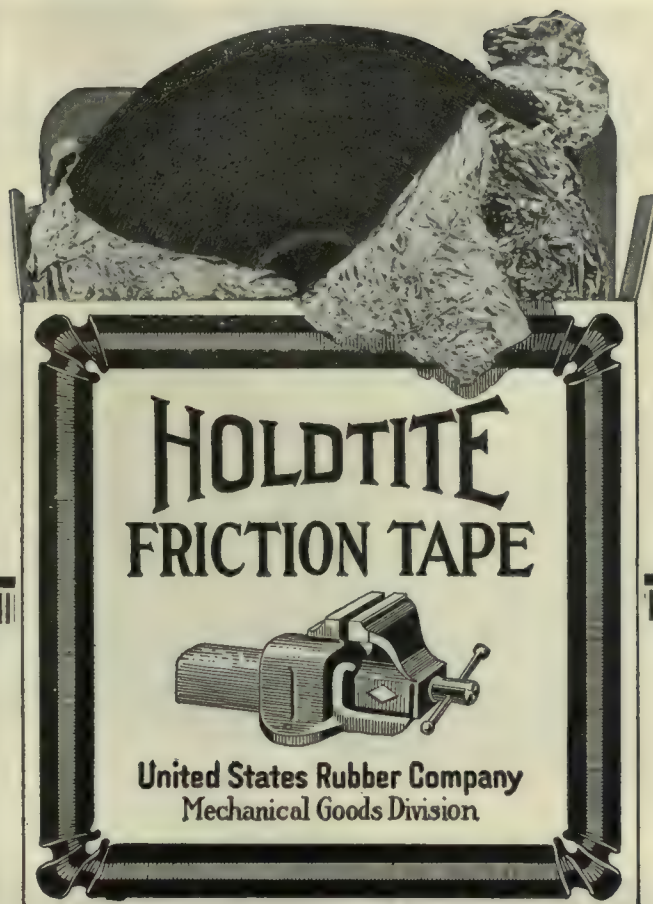
## Both Advertiser and Reader Must Be Satisfied

Naturally you are interested *not only* in the **INCOME** from your car card space *but also* in the **STABILITY** of that income. It is because **COLLIER SERVICE** concerns itself so thoroughly with satisfying its clients that the railway company is assured a permanent income uninfluenced by fluctuating business conditions.

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Candler Building  
220 West 42nd Street, New York City





**T**HERE is not a better or more favorably known black Friction Tape manufactured than "Holdtite." It is heavily coated on both sides with a high grade compound, and is recommended for general electrical work.

United States Friction and Splicing Tapes meet every requirement. All are highly dielectric; contain no free sulphur and keep their original good qualities.

"A Tape for Every Trade and Purpose."

**United States Rubber Company**





# Here is the New Columbia Foundry



## Anything in the Line of Castings

**G**REY Iron, Semi-Steel—Bronze Composition. We will make any casting you desire—and make it *well*. Whether it's a 6000-lb. cast-iron base plate for a machine tool or the smallest detail that can be poured, you are assured of a high-grade product. Columbia foundry facilities are now equal to any demand.

## Columbia Machine Works & Malleable Iron Co.

Atlantic Ave. and Chestnut St.

Brooklyn, N. Y.

### TOOLS

Armature and axle straighteners  
Armature shaft straighteners  
Armature buggies and stands  
Babbitting molds  
Banding and heading machines  
Car hoists  
Car replacers  
Coil taping machines for armature leads  
Coil winding machines  
Pinion pullers  
Pit jacks  
Signal or target switches  
Tension stands

W. R. Kerschner Co., Inc., N. Y.  
Holden & White, Inc., Chicago  
F. F. Bodler, San Francisco  
Railway & Power Eng. Corp.,  
Ltd., Toronto, Ont.



### CAR EQUIPMENT

Armature and axle bearings  
Armature and field coils  
Bearings (axle and armature)  
Brush-holders and brush-holder springs  
Brake, door and other handles  
Brake forgings, riggings, etc.  
Car trimmings  
Commutators  
Controller handles  
Forgings of all kinds  
Gear cases (steel or malleable iron)  
Grid resistors  
Third-rail shoe beams and accessories  
Trolley poles (steel) and wheels



**“We’ve Put It To Every Possible Test  
—It’s Made Good”**



## **OILLESS TROLLEY WHEEL and V-K NON-ARCING HARP**

Both these devices, with the rest of the More-Jones Products, worked out in our Laboratory under the supervision of expert chemists and metallurgists and subjected to many trials under all sorts of operating conditions. There they stood rigid tests, and proved they were ready for real service.

That is the demand of every electric road today. No device is bought in quantity lots until it has proved its superiority under exacting service requirements.

For instance, the V-K oilless trolley wheel is made of new metal exclusively, extremely tough and long wearing, and, in combination with the V-K Non-Arcing Harp, reduces current waste and prevents all arcing due to loose fitting axle pins. The patented gripping device locks the pin securely in its socket. Having an oilless bearing there is no insulation. This greatly improves current flow and lengthens life of wheel, harp and overhead.

*Illustrated Catalog on request.*



# **V-K**

**More-Jones Brass & Metal Co.**

3134 No. Broadway

St. Louis, U. S. A.





# COSMIC METAL BEARINGS

**Prevent Hot Boxes—Eliminate Babbitting**

**If we fail to eliminate your Bearing Troubles,  
no matter how chronic, we make no charge.**

Cosmic Metal bearings for armature, axle or motor are made exceptionally strong and tough, to give long life and a slow, even rate of wear. Under actual working conditions and tests they have proved far more dependable than bearings made of other metals.

They have sufficient strength to carry any load and are easily lubricated. If, through accident or other cause, they should not be properly lubricated, they will continue to run *without injuring the machinery* until attended to.

This is a very important point, because ordinary bearings which are improperly lubricated, or hard to lubricate, will generate intense heat. This rapidly causes the bearing to melt, or to fuse and stick, causing serious and costly damage to machinery.

Bearings made of Cosmic Metal will not stick or grab the shaft or axle, even though lubrication *does* not reach them. They prevent hot boxes with their resultant accidents, and in the end are a much safer and more economical equipment than any other bearing. Let us send further information.

**COSMIC METAL COMPANY**  
420 Walnut Street, Philadelphia



## *8 Times Around the Globe Without Repairs*



4 Years Ago Charlotte, N. C.

## **BOYERIZED**

Over four years ago the Southern Public Utilities Company, Charlotte, N. C., made their initial installment of BOYERIZED Brake Pins and Bushings.

Charlotte cars made 45,000 to 48,000 miles a year at a schedule speed of 9.5 m.p.h.

That means nearly 200,000 miles of service.

Yet not one BOYERIZED Pin has been removed for wear!

BOYERIZED Products saved money for Charlotte. Will you give them the opportunity to do as much for you?



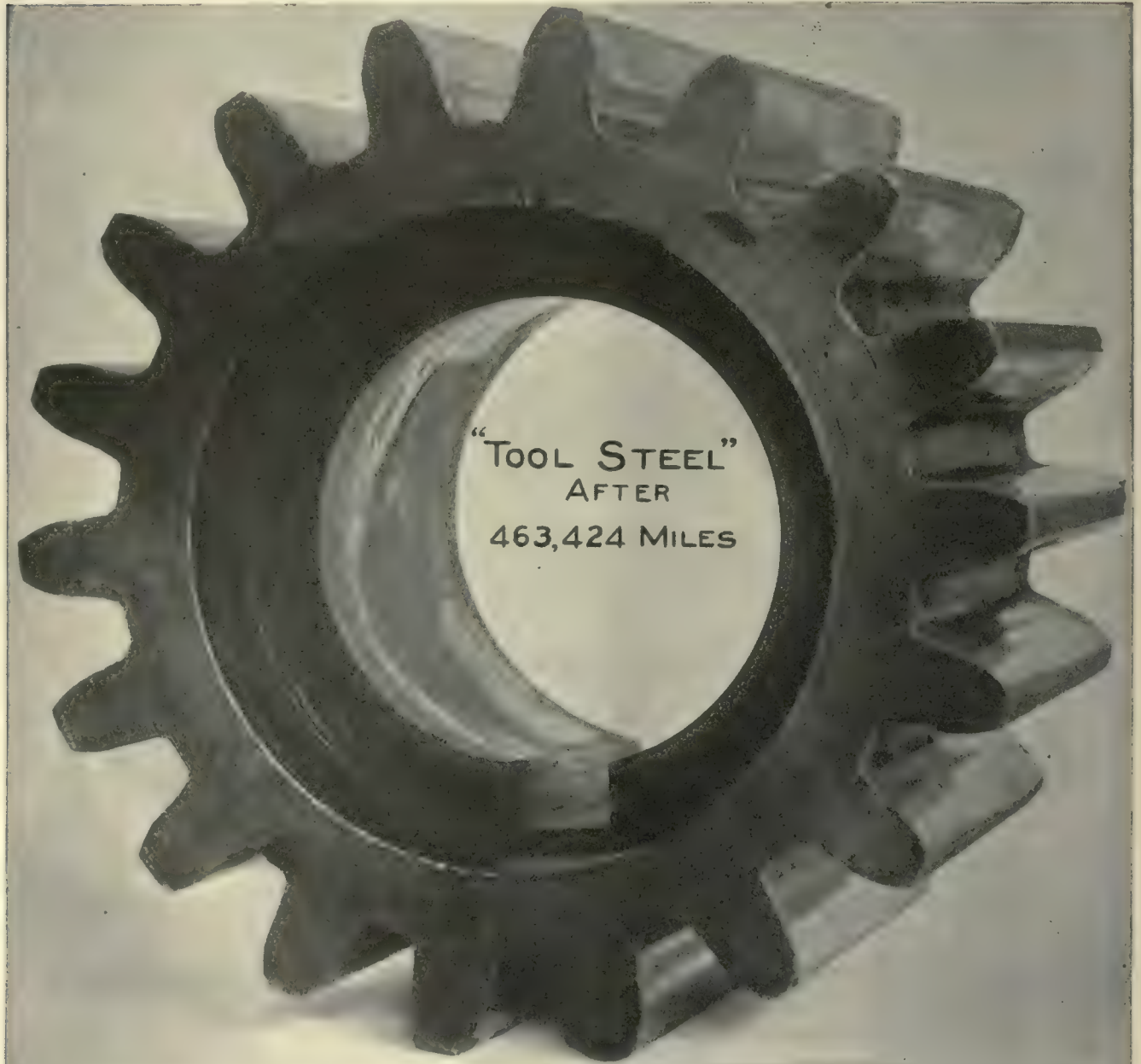
ELECTRIC RAILWAY SUPPLIES

**Bemis Car Truck Company**

SPRINGFIELD MASS



*Just taken out of service long enough  
to get its "pitcher taken". It's running again now.*



IN SERVICE TEN YEARS  
CHICAGO ELEVATED LINES  
ONE THIRD WORN OUT.

*TOOL STEEL GEAR & PINION CO.*



# Study the Comparative Results of Open Hearth and Electric Steel Armature Shafts for Electric Railway Service

*Here they are:*

(Columns showing results obtained in test)

Properties	Open Hearth Steel	Electric Steel General Steel Co.
Ult. Strength, lbs. per sq.in.....	89,100	105,140
Elastic Limit, lbs. per sq.in.....	41,060	64,850
Elongation in 2 in.....	21.5%	22.5%
Reduction of Area .....	31.2%	52.3%
Fracture	Silky, small cup.	Silky, full cup.
Elastic—Torsion, lbs. sq.in.....	16,750	33,700
Shearing Strength, lbs. sq.in.....	62,400	76

The comparative results given here were obtained from tests taken from an ordinary Open Hearth steel armature shaft, and one taken from a high-grade steel, made in a “Pittsburgh” electric furnace. Both were the normal product. Heat treated in each case.

We are equipped to handle the forging of axles and armature shafts from our own manufactured electric furnace steel.

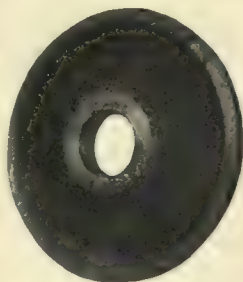
*We Solicit Your Inquiries*



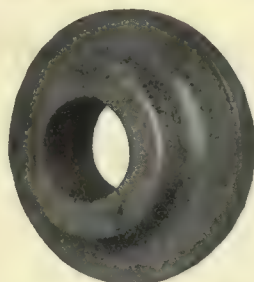
**GENERAL STEEL CO.**

Public Service Building, MILWAUKEE, WIS.





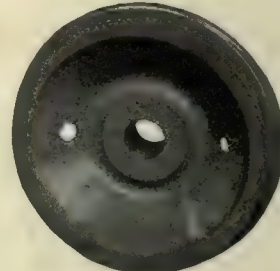
Turbine Bucket Wheel



Shaft Coupling



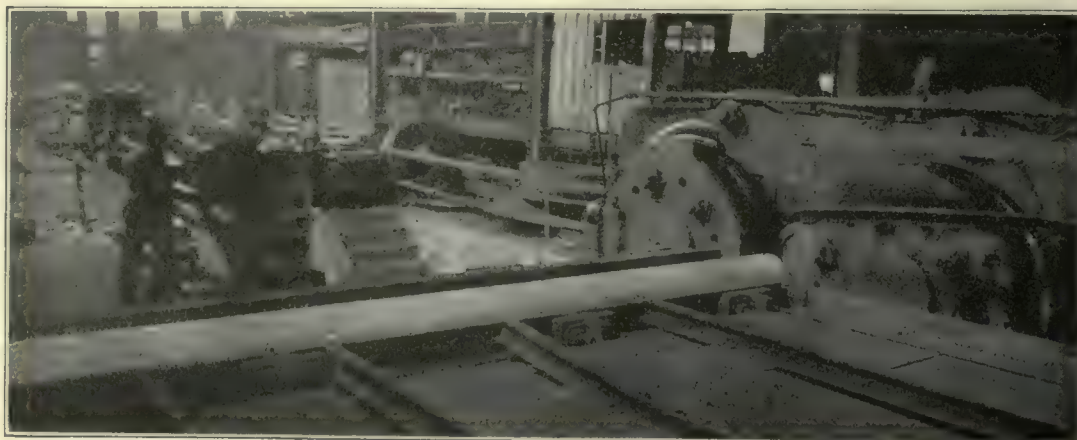
Rough Turned Gear Blank



Street Car Wheel

# CAMBRIA

## CIRCULAR FORGED AND ROLLED SECTIONS



Slick Rotary Shear with Bar Ready to Enter

**A**FTER the ingot has been rolled into a cylindrical bar eleven to fifteen inches in diameter, according to the size desired as described in our last advertisement, it is fed into the rotary shear illustrated above and hot-cut into blocks of the proper size and weight to make the particular wheel or blanks desired.

### MIDVALE STEEL AND ORDNANCE COMPANY CAMBRIA STEEL COMPANY

*General Sales Office, Widener Building, Philadelphia, Pa.*

*District Sales Offices: Atlanta, Boston, Chicago, Cincinnati, Cleveland, Detroit, New York, Philadelphia, Pittsburgh, San Francisco, Salt Lake City, Seattle, St. Louis,*

CONSOLIDATED STEEL CORPORATION, 165 Broadway, New York, is the sole exporter of our commercial products. Address all export inquiries to them.

*"We Want You to Become Better Acquainted With Us" Series. Number 5-1.*



# **"STANDARD"**

Steel Tires

Steel Tired Wheels

Solid Rolled Steel Wheels

O. H. Steel and Malleable Iron Castings

Solid Forged Gear Blanks

Steel Forgings

Iron Forgings

Forged and Rolled Steel

Pipe Flanges

Ring Dies

Rings

Roll Shells

Steel Springs



*"The 'Standard' Brand on your material  
is an assurance of eventual economy."*



## **STANDARD STEEL WORKS CO.**

GENERAL OFFICES:

**MORRIS BUILDING, PHILADELPHIA, PA.**

CHICAGO  
ST. LOUIS  
HAVANA, CUBA

RICHMOND  
SAN FRANCISCO  
NEW YORK  
MONTEREY, MEX.

MEXICO CITY  
LONDON, ENGLAND  
PARIS, FRANCE



# Triple Check

If experience in building one man cars is worth something to you -

✓ We built the first

If reputation for thorough workmanship and high grade materials count -

✓ We're known as the  
"Quality Shop."

If car design is important in your eyes

✓ The Burney Car  
is what we recommend.

Play all three to win

St Louis Car Co  
St Louis Mo.





...and money in the war, to conserve to the uttermost these foundations of national wealth and prosperity. Safety is a duty which we owe to those returning from the battlefields of France, because where this country has to support the dependents of those injured through accidents at home it is unable, by just so much, to give to the families of those crippled or killed in its defense.

## Make Wire Cutting Safe for Your Men

The word RIMCO stamped on the head of the plier and on the insulation insures the safety of your men because RIMCO Pliers have been tested to 10,000 volts.

The semi-soft rubber insulation is firmly bonded to the handle and no matter how often you drop the plier or how roughly you handle it, the insulation will neither crack, break, nor become detached from the handle.

*For ECONOMY and SAFETY—RIMCO. Write.*

**Rubber Insulated Metals Corp., Plainfield, N. J.**

SALES AGENTS: Electric Service Supplies Co., 17th and Cambria Sts., Philadelphia.  
Canadian Agent: Lyman Tube & Supply Co., Ltd., Montreal, Toronto and Winnipeg.

*Exclusive Export Agents  
International*

**Western Electric Company**  
INCORPORATED

# WEISS SWITCH LOCK

## No More Split Switches



### Simple and Indestructible

This switch lock is exceedingly simple in design, having very few parts, none of which is complicated. The box is absolutely tight, to prevent loss of oil, with which it is filled. It has a stuffing box where the connecting rod passes through to prevent the entrance of water or dirt.

The heaviest traffic will not interfere with or damage the Weiss Switch Lock.

You can install one on approval, for 30 days' trial, but be sure to give measurements from top of rail to center of bolt holes.

A safety necessity for street and interurban railways. Locks both right and left—no chance of a split switch—few parts—safe, dependable, simple in construction and easily installed. Fits any rail section. Used by many prominent roads. Send us a trial order and put them to the test.

**Watertight  
Non-Freezable  
Mud-Proof  
Sand-Proof**

**WEISS SWITCH LOCK CO., 600 E. Capitol Ave., Springfield, Ill.**





# Anderson

## Overhead Line Material

This is the rehabilitation period for electric railways. Your overhead construction needs replacements as well as the rest of your equipment.

Anderson Steady Strains, Feeder Insulators can be depended upon under the severest of weather conditions.

Get your overhead line material before it is too late.

*Send for information on the Anderson line.*

**Albert & J. M. Anderson Mfg. Co.**

*Established 1877*

**289-293 A St., Boston, Mass.**

Branches—New York, 135 B'way. Philadelphia, 429 Real Estate Trust Bldg. Chicago, 105 So. Dearborn St. London, 48 Milton Street.



## This is the Sherardized Yoke

that makes White's Porcelain Trolley Hanger so simple and quick to hang and align on the wire—that makes it the most economical hanger to use.

# WHITE'S

## Porcelain Trolley Hanger

has but three simple parts—the sherardized malleable iron yoke—the heavy glazed porcelain insulator that doesn't crack or deteriorate—the standard bolt furnished in sherardized steel or bronze.

But let us send you a sample with quotations or complete hangers or parts. You can see *why* for yourself. We can make

*Immediate Delivery*

**T. C. White Electrical  
Supply Co.**

**1122 Pine Street, St. Louis, Mo.**







## To Hold Down BUILDING COSTS Specify "PRUDENTIAL"

Rather a hard task that—formerly. Not only must the costs be low but the building must be fireproof. "Prudential" Buildings have solved this problem. It is now possible to erect a FIREPROOF PRUDENTIAL at a lower cost than either brick, concrete or wood, and it lasts better. Further, when you're through with it, it's portable and can be taken down and erected elsewhere.

### "PRUDENTIAL" PORTABLE STEEL BUILDINGS

are rapidly supplanting all other construction, for they are fire- and vermin-proof. Their contents are thoroughly protected. The buildings are made of steel plate, heavily galvanized, and last indefinitely.

Besides all this, they cost less to buy, erect or maintain. Many large users

have learned this fact and now regularly specify "Prudential."

For that Waiting Room or Shed specify "PRUDENTIAL"—for that Freight Shed, "Prudential"—for that Power House addition, that Office, or Flagman's Booth, try "Prudential."

Write for Catalog 230

**The C. D. Pruden Co., Inc.**

Office and Factory  
BALTIMORE, MD.

New York Office  
56 PINE ST., NEW YORK CITY



## READING REVERSIBLE RAIL BENDER FOR BENDING ALL SECTIONS TEE RAIL



A 2 in 1 Bender

MANUFACTURED  
AND SOLD BY

**THE READING SPECIALTIES CO., Reading, Pa.**



BRANCH OFFICES: 111 Broadway, New York City; 747 Railway Exchange, Chicago, Ill.; 4th National Bank Bldg., Atlanta, Ga.; Colorado Bldg., Washington, D. C.; 1st National Bank Bldg., Denver, Col.; 1804 Commonwealth Bldg., Pittsburgh, Pa.; 525 Market St., San Francisco Calif.; 2003 Jefferson County Bank Bldg., Birmingham, Ala.



## SPECIFY THIS MARK



TRADE MARK REG. U.S. PAT. OFFICE  
ON EVERY TIMBER, BOARD AND BUNDLE  
of CYPRESS, "The Wood Eternal."

It is your Insurance of true  
**REPLACEMENT  
ECONOMY**

IT'S THE CONSTANT "LITTLE REPAIRS" THAT  
BUILD UP EXCESSIVE MAINTENANCE COSTS.

Check up on the cost of the work being done on your line—not the big replacements and new construction work—but just the little jobs—replacing a few rotted cross-arms or a few decayed ties, or a bit of fencing, and you will probably be surprised to find how much these items total in the course of a year.

Of course you can never get away from all of this sort of expense, but you can eliminate a surprisingly heavy proportion of it by using

**CYPRESS**

"THE WOOD ETERNAL"

not only on new construction, but on all replacement work.

**All-heart Cypress comes nearest**

to being "decay proof" of any lumber in the market suitable for railway use.

Several of the largest railway companies in the country have found the use of Cypress a paying investment.

The data that substantiates this fact will be promptly furnished, if you ask for it.

**Southern Cypress  
Mfrs.' Assn.**

1265 Hibernia Bank Building  
New Orleans, La.

or

1265 Heard National Bank Building  
Jacksonville, Fla.

# NOARK

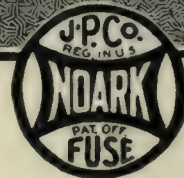
## APPROVED FUSES

### "Noark" is a Safe Policy

The cost of a fuse is merely a premium you pay for insurance against disaster.

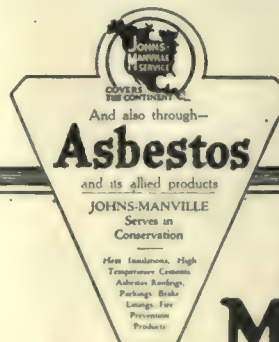
When you put a Noark N. E. C. Fuse in your circuit you can rest assured that it will carry the normal load but blow the instant an overload or short-circuit threatens to wreck your equipment.

Noark trustworthiness is the result of accurate calibration. For over twenty years we have been building Noark Fuses on a laboratory basis of constant checking and careful supervision throughout each and every step of manufacture.



Approved by  
Underwriters  
Laboratories

Manufactured by the Johns-Pratt Co., Hartford,  
Conn. H. W. Johns-Manville Co., Sole Selling Agents.

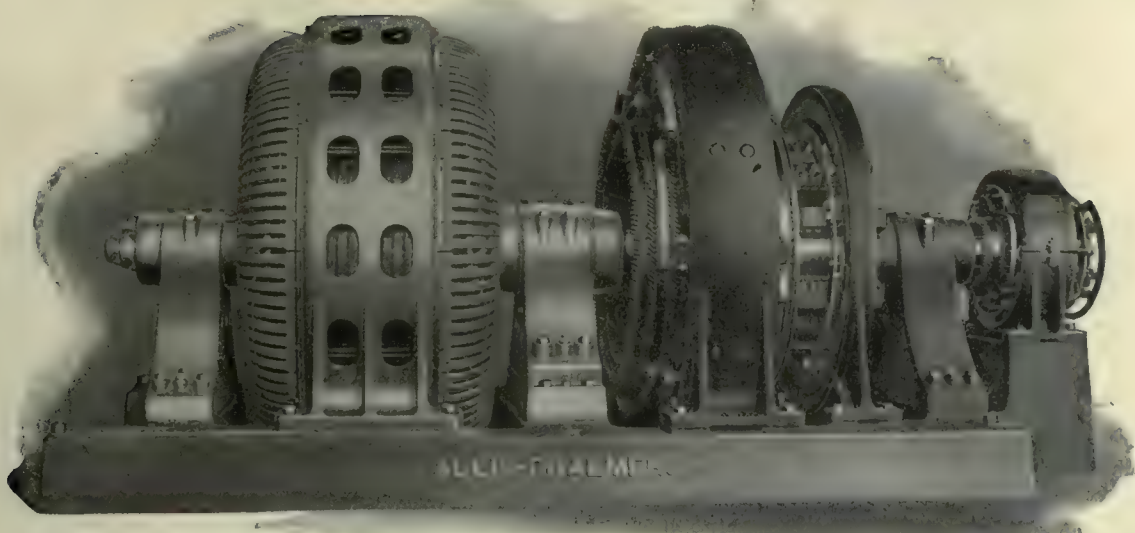


H. W. JOHNS-MANVILLE CO.  
New York City  
10 Factories—Branches in 63 Large Cities

# JOHNS-MANVILLE

## ELECTRICAL MATERIALS



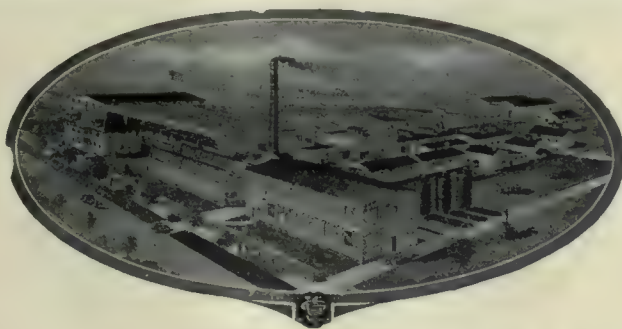


## MOTOR-GENERATOR SETS

Of All Sizes and Characteristics

# ALLIS-CHALMERS

Milwaukee, Wis. U.S.A.



### Uniformity

To make a brush that gives perfect satisfaction to the user requires the best of raw material and the services of expert electrical engineers.

But—it is essential on subsequent reorders for the same brush, that the second supply give the same satisfaction as the first. To get uniformity in the product, requires uniformity in manufacture.

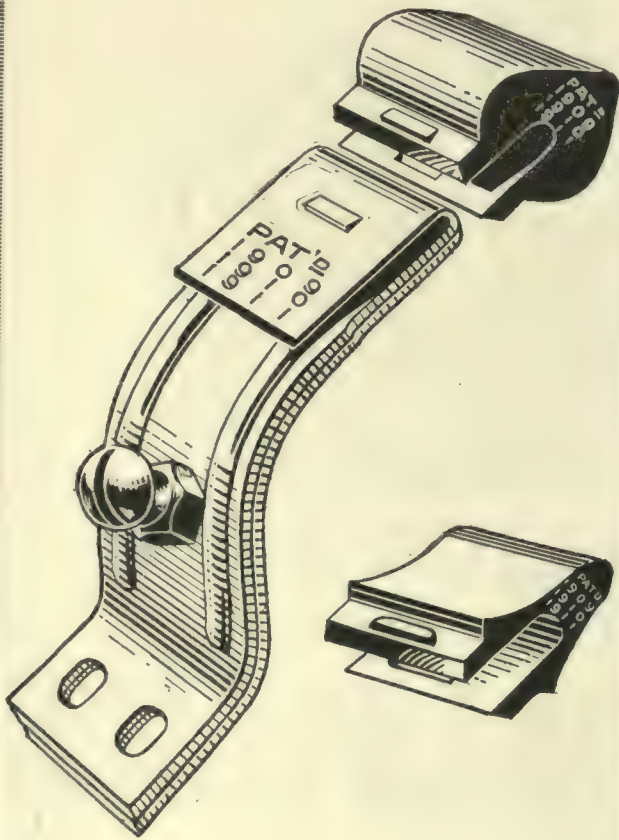
Numerous repeat orders from U. S. G. Brush users are a safe indication that they are getting satisfaction with every purchase of U. S. G. Brushes.

*To order is to reorder. Write*

## The United States Graphite Co.

Saginaw, Mich., U. S. A.





## Trigger-Lock Reversible Controller Fingers

Copper is at all times the most expensive material used by Electric Railways. In Trigger Lock Reversible Controller Fingers, a replaceable extruded copper tip of twice the life of drop-forged copper is used, thus avoiding the scrapping of the entire finger. And since this extra-life tip can be reversed for re-use, the **ECONOMY** is still greater. Twice the life plus the time and labor saved in replacement.

### Triggerlock Reversible Controller Finger.

814-16 Bath Ave.      557 King St., West  
Niagara Falls, N. Y.      Toronto, Canada



## "Star" Lathe Beds are *Hand-scraped*

Hand-scraped because we have found by 36 years' experience in manufacturing lathes—in which time we have tried out every known method of shop practice—that the good old-fashioned method of hand-scraping is the best way to secure perfect lathe beds.

In building "Star" Lathes every step is according to the best manufacturing methods—the result is lathes characterized for accuracy, strength and general excellence. "Star" Lathes are especially fitted for railway repair work—they are compact, sturdy, easily operated and adapted to a great range of work.

**Built in 9-in., 11-in., 12-in., and 13-in. swing sizes. Full line of attachments available.**

**The Seneca Falls Mfg. Co.**

**385 Fall St., Seneca Falls, N. Y.**



13 in. x 6 ft.  
Star Engine  
Lathe



# NILES-BEMENT-POND CO.

GENERAL OFFICES, 111 BROADWAY, NEW YORK

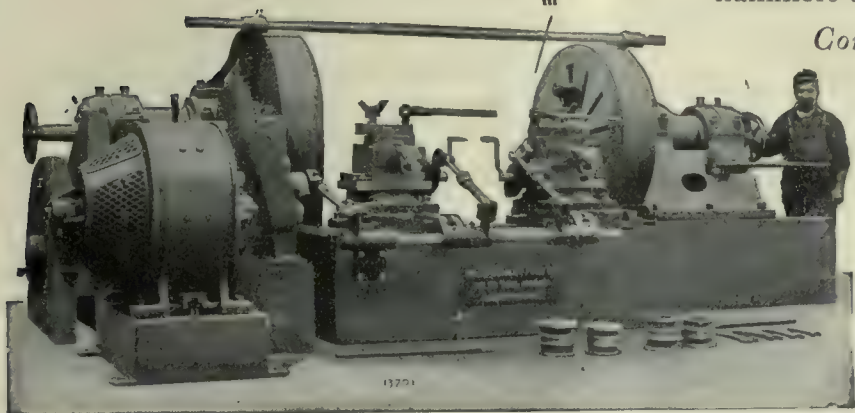
## MACHINE TOOLS

For Electric Railway Repair Shops

We are in a position to furnish complete machine tool equipment for electric railway repair shops, including steam hammers and electric traveling cranes.

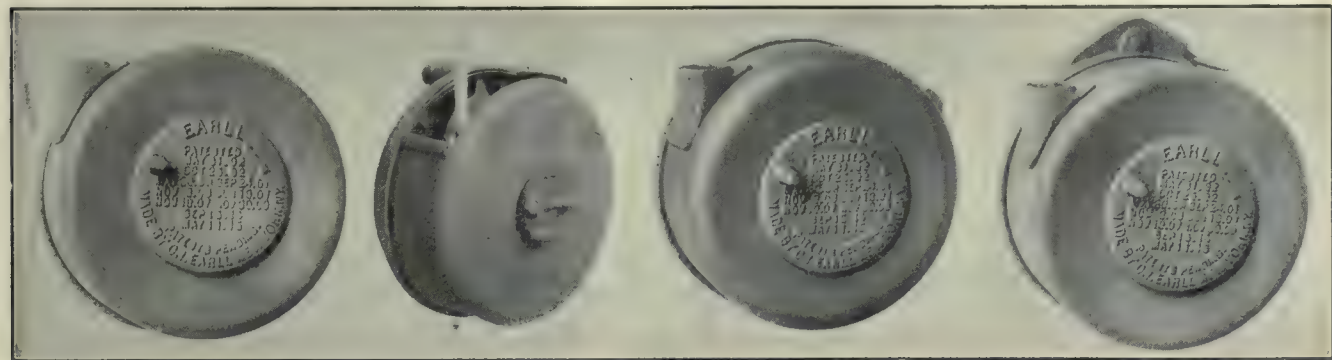
*Correspondence Invited.*

Standard  
Car Wheel  
Lathe



### *Our Line Includes*

Axle Lathes, Car Wheel Boreers, Hydraulic Wheel Presses, Shapers, Planers, Drills, Slotters, Bolt Cutters, Milling Machines, etc.



The results of long study and successful manufacture of the Earll Catchers and Retrievers have taught us the varied requirements of users.

Every feature has been designed and adopted with knowledge of the conditions of operation.

The design, material and workmanship in all Earll Catchers and Retrievers give them a recognized position in the trade.

Earll Catchers and Retrievers assure users of the highest grade of service, convenience, efficiency and economy. They will bring these advantages to you.

Holden & White, Inc.  
Chicago, Ill.

Newly appointed agents for the  
Central and Middle Western States

C. I. EARLL,  
YORK, PA.



## Metal Fare Tokens



Enlarged to 1½ times actual size

### Nickel-Silver Bronze or Brass

Designs developed according to your ideas and subject to your approval. We make the metal, the dies and the tokens.

We have the experience, the equipment, the capacity for rapid quantity production.

*Information on request.*

## Scovill Mfg. Co.

*Established 1802*

Waterbury, Conn.

New York  
Chicago

Boston  
Detroit

*In War or  
Peace Times—*

## Cut Out the Waste!

Clean up! Do it NOW! Do it regularly!

Every piece of Idle Equipment, Unnecessary Material or Scrap represents WASTE!

—*waste*

**Money!**  
**Time!**  
**Space!**  
**Labor!**  
**Material!**

—the *money* such equipment or material cost earns nothing and is not available for other use.

—the *time* it is idle is wasted when it can render service elsewhere.

—the *space* it occupies costs money and may be needed for other purposes.

—the *labor* of its manufacture is wasted and also the labor of producing a duplicate for the man who *can* use it.

—the *material* it represents would be useful in another form.

Cut out *all* this waste! Don't have material or equipment around that is not needed. Turn it into cash.

There is always a market for either scrap or good used machinery. Conservation of both materials and machinery can be practiced with just as much profit in peace as in war times.

Buyers for surplus material, good used machinery, junk or scrap, can easily be found through the

## Searchlight Section





# BAYONET

## Overhead Equipment for Present-Day and Future Needs

The operation of light weight one-man cars is growing rapidly and the largest users of one-man cars use Bayonet Trolley Equipment.

Perhaps you do not operate light weight cars. Whether or not you ever intend to, you will find complete satisfaction in Bayonet Harps, Wheels and Bases. They have met every test successfully on one-man cars as well as on the heaviest and highest speed interurban cars.

*Our catalog will furnish the details. Write.*

**BAYONET TROLLEY HARP CO.**  
Springfield, Ohio, U. S. A.

Consider these excelling points of Bayonet Equipment: perfect traction; greater flexibility to pole action; uniform wire pressure at any angle of pole; no bent trolley poles.

# Eureka



Every bit of metal that goes into "Eureka" products, whether it is brass, phosphor bronze or copper, is new. Not a grain of scrap is used and every part is guaranteed to be as fine as first grade material, expert workmanship and rigid inspection can make it.

We carry a large stock of standard parts and can ship your orders with the least delay. Special parts can be made to your order and our plant is so thoroughly up-to-date in man-power and equipment that our deliveries will surprise you.

*Our greatest output is satisfaction. Let us supply you.*

Write for Catalog covering materials wanted. Information and estimates gladly furnished

**The Eureka Company**  
North East, Pa.

We also manufacture Commutators, Brush Holders, Controller Contact Fingers and Segments and Sleet Cutters, Bearings and Bushings, Copper and Bronze Forgings and Castings, Line Materials, etc.



## Operating Cars Without Gear Cases is Expensive

and unnecessary if you will order your requirements before your stock is exhausted.

Make due allowance for prevailing conditions affecting manufacture and delivery.

We have sufficient stock of raw materials to take care of orders booked, as well as your requirements for three months commencing shipment 8 to 10 weeks from receipt of order.

**THAYER & COMPANY, Inc.**  
111 BROADWAY, NEW YORK CITY

## BRAKE SHOE STANDARDS

SAVE MATERIAL  
SAVE LABOR  
SAVE TIME  
SAVE MONEY

*Ask Us?*

**American Brake Shoe & Foundry Co.**  
30 Church Street, New York  
332 S. Michigan Ave., Chicago  
Chattanooga, Tenn.

The subscription was discontinued because a "Want" advertisement brought results

Editor—"We are sorry to lose your subscription, Mr. Jackson. What's the matter? Don't you like our politics?"

Mistah Jackson—"Tain't dat, sah; 'tain't dat. Mah wife jes' been an' dun landed a job o' wuk for me by advertisin' in youh darned ole papah."

If you're looking for a "job o' wuk"—

If you're looking for a competent man who will be able to handle a big or a little "job o' wuk" and want RESULTS—

—there is no more efficient or economical method of securing either than the insertion of a card in the

**SEARCHLIGHT  
SECTION**



## Aluminum Company of America

Manufacturers of

# ALUMINUM

## Electrical Conductors

All-Aluminum and Steel Reinforced  
for

Transmission Lines  
Railway and Industrial Feeders  
Signal Circuits  
Railway Catenary Construction  
Bus Bars

also

Ingots—Rods—Rivets—Extruded Shapes  
Sheet Tubing

also

Aluminum Solders and Flux  
Flux and Wire for Autogenous Welding

### GENERAL SALES OFFICE

Oliver Bldg., Pittsburgh, Pa., U. S. A.

Canada: Northern Aluminum Co., Ltd., Toronto.

Latin America: Aluminum Co. of South America, Pittsburgh, Pa.

England: Northern Aluminium Co., Ltd., London.

## STEEL POLES FOR EVERY POLE PURPOSE



Cut shows Bates Steel Poles in use by the Royal Swedish States Rys., electrifying the steam railroads of Sweden, Lapland, located about 75 miles south of the Arctic Circle, in the land of the Midnight Sun, the most northerly railroad of the world.

Bates Steel Poles are becoming universally popular world wide. Repeat orders testify their general suitability for every Pole purpose.

Telegraph, Telephone, Power Transmission, Electric Trolley Lines, Electric Lighting, Etc.

Highest class and most up-to-date steel pole equipment in the world. Our STEEL POLE TREATISE tells the story. Ask for it.

About 2,000 tons of steel constantly on hand; hence prompt shipments.

Tubular Steel Poles cost 50 per cent. more than Bates Steel Poles, yet Bates Poles are 100 per cent. stronger—will last 100 per cent. longer, cover a much broader range of adaptability and are much more artistic than Tubular Poles. Ask us to verify these facts.

BATES EXPANDED STEEL TRUSS COMPANY

208 So. LaSalle Street

Chicago, Ill., U. S. A.

## Don't Take Chances!

The Name

"Mathias Klein  
& Sons"

on Safety Straps  
and Belts means  
that they are SAFE!

(Look for the name)

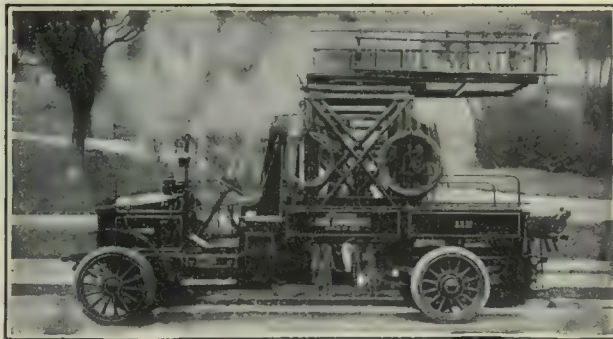
We can make IMME-  
DIATE SHIPMENT of  
leather goods — belts,  
safety straps, climber  
straps, tool bags, etc.

The name, Mathias  
Klein & Sons, coupled to  
leather goods for linemen  
and electricians means the  
same assurance of quality and trustworthiness as it  
does in connection with tools.

Don't Forget—Our Complete Illustrated  
Catalog Awaits Your Request.

Mathias Klein & Sons, Tool Mfrs.

Canal Station 25, Chicago



TRUCK WITH TOWER IN RUNNING POSITION

## This 3-Section TRENTON TOWER

is not only more convenient, but stronger than  
the older type.

The top section is reinforced by the inter-  
mediate section. The 3-section design makes  
it possible to raise the platform 16 inches  
higher and drop it 12 inches lower than can  
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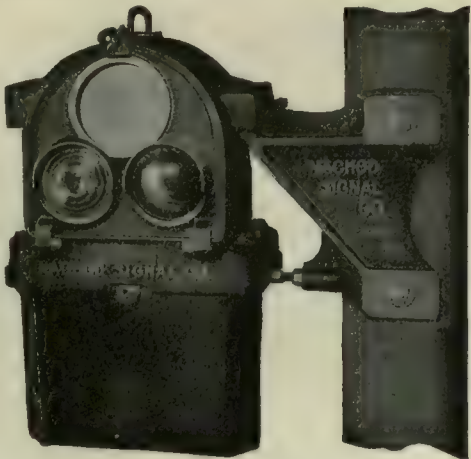
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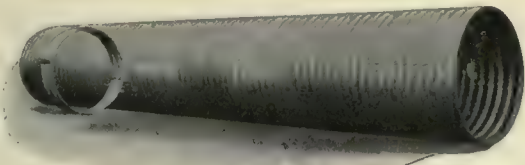
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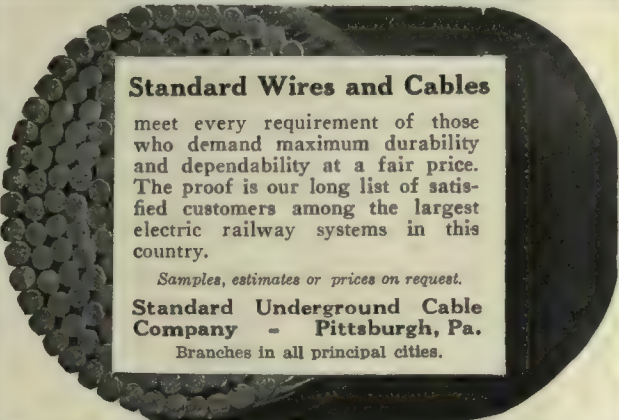
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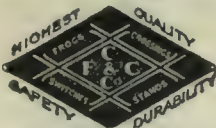
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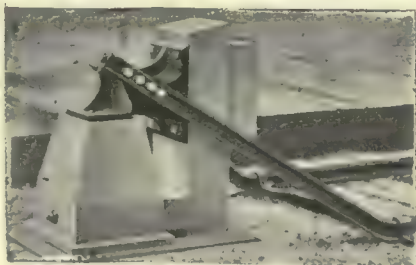
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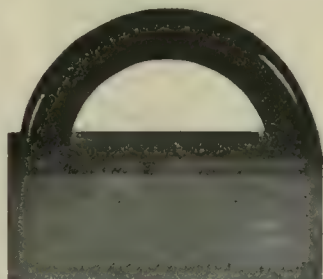
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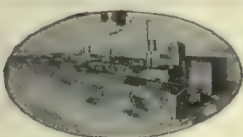
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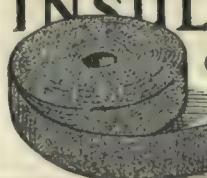
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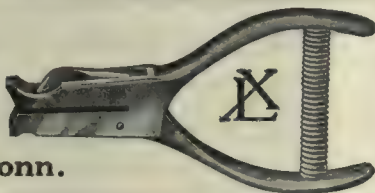
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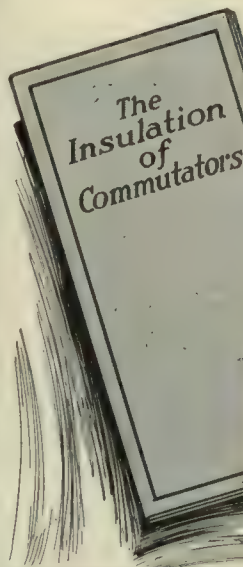


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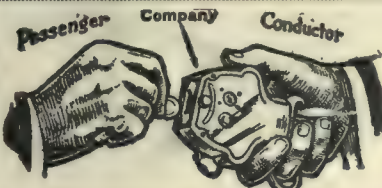
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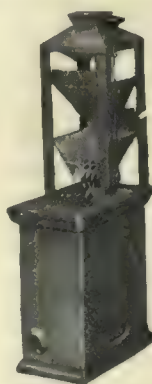
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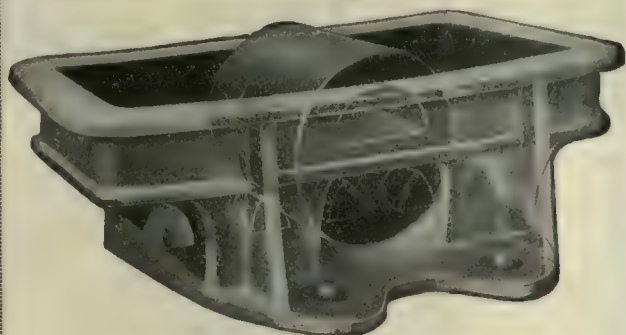
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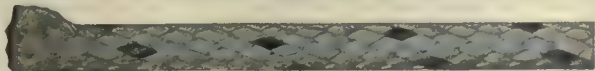
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Original letters of recommendation or other papers of value should not be enclosed to unknown correspondents—send copies.

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POSITION by man experienced in armature winding, controller repairing and car wiring with good chance for advancement. Western states preferred. PW-376, Elec. Ry. Journal, Philadelphia.

STOREKEEPER, 6 years electric railway experience, wishes position either in stores or purchasing departments where ability and integrity are qualifications for advancement. Address PW-382, Elec. Ry. Journal, Chicago.

POSITION wanted; 20 years' experience with electric railways; ten years with steam roads as executive and manager, desire change. Address E. A. Burrill, 818 Ohio Bldg., Toledo, Ohio.

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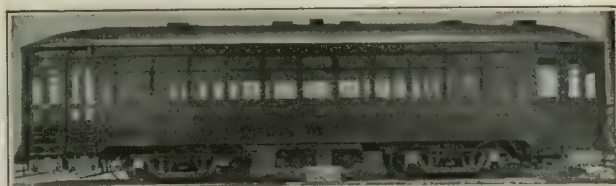
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# WHAT AND WHERE TO BUY

Equipment, Apparatus and Supplies Used by the Electric Railway Industry with  
Names of Manufacturers and Distributors Advertising in this Issue

Advertising, Street Car  
Collier, Inc., Barron G.

Air Pressure Relays  
Philadelphia Electric Company  
Supply Dept.

Air Rectifiers  
Holden & White, Inc.

Anchors, Guy  
Electric Service Supplies Co.  
Holden & White, Inc.  
Johns-Manville Co., Inc., H. W.  
Ohio Brass Co.  
Westinghouse Elec. & M. Co.

Ash Storage Tanks, Cast Iron  
Green Engineering Company

Automobiles and Buses  
Brill Co., The J. G.

Axle Straighteners  
Columbia M. W. & M. I. Co.

Axles, Car Wheel  
Bemis Car Truck Co.  
Brill Co., The J. G.  
Cambria Steel Co.  
Carnegie Steel Co.  
General Steel Co.  
Midvale Steel & Ordnance Co.  
National Railway Appliance Co.  
St. Louis Car Co.  
Standard Steel Works Co.  
Westinghouse Elec. & M. Co.

Babbitt Metal  
Ajax Metal Co.

Babbitt Devices  
Columbia M. W. & M. I. Co.

Badges and Buttons  
Electric Service Supplies Co.  
International Register Co., The

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Johns-Manville Co., H. W.  
Nichols-Lintern Co.

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Electric Storage Battery Co.

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Cosmic Metal Co.  
Eureka Co.  
General Electric Co.  
More-Jones Brass & Metal Co.  
St. Louis Car Co.  
Westinghouse Elec. & M. Co.

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Holden & White, Inc.  
Stucki Co., A.

Bearings, Roller & Ball  
Gurney Ball Bearing Co.

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Brill Co., The J. G.  
Columbia M. W. & M. I. Co.  
Electric Service Supplies Co.  
St. Louis Car Co.

Benders, Rail  
Reading Specialties Co.  
Niles-Bement-Pond Co.  
Wharton, Jr., & Co., Wm.  
Zelnicker, Walter A., Supply Co., Inc.

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Babcock & Wilcox Co.

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Johns-Manville Co., H. W.

Boiler Coverings  
Johns-Manville Co., H. W.

Boiler Tubes  
National Tube Co.

Bond Testers  
American Steel & Wire Co.  
Roller-Smith Co.

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American Steel & Wire Co.  
Electric Railway Improvement Co.  
Electric Service Supplies Co.  
Ohio Brass Co.

Bonds, Rail  
American Steel & Wire Co.  
Electric Railway Improvement Co.  
Electric Service Supplies Co.  
General Electric Co.  
Johns-Manville Co., H. W.  
Ohio Brass Co.  
Westinghouse Elec. & M. Co.

Boring Tools, Car Wheel  
Niles-Bement-Pond Co.

Controller Regulators  
Electric Service Supplies Co.

Brackets and Cross Arms (See also  
Poles, Ties, Posts, Etc.)

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Bates Expanded Steel Truss Co.  
Electric Railway Equipment Co.  
Hubbard & Co.  
Lindsley Bros. Co.  
Ohio Brass Co.

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Holden & White, Inc.  
Smith-Ward Brake Co.  
Westinghouse Traction Brake Co.

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Amer. Brake Shoe & Fdry. Co.  
Barbour-Stockwell Co.  
Brill Co., The J. G.  
Columbia M. W. & M. I. Co.  
St. Louis Car Co.

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Parts

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Columbia M. W. & M. I. Co.  
General Electric Co.  
Holden & White, Inc.  
National Brake Co.  
St. Louis Car Co.  
Safety Car Devices Co.  
Westinghouse Trac. B. Co.

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Green Engineering Co.

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American Bridge Co.  
Thomson-Starrett Co.

Brooms, Track, Steel or Rattan  
Zelnicker, Walter A., Supply Co., Inc.

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General Electric Co.  
Jeandron, W. J.  
Morgan Crucible Co.  
National Carbon Co., Inc.  
United States Graphite Co.  
Westinghouse Elec. & M. Co.

Brushes, Graphite  
United States Graphite Co.

Brush Holders  
Anderson Mfg. Co., A. & J. M.  
Columbia M. W. & M. I. Co.  
Eureka Co.

Buckets  
Blaw-Knox Company

Buildings, Portable  
Pruden Co., C. D.

Bumping Posts  
Mechanical Mfg. Co.  
Bunkers, Coal  
American Bridge Co.

Bushings, Case Hardened & Man-  
ganese  
Bemis Car Truck Co.

Cable End Bells  
Philadelphia Electric Company  
Supply Dept.

Cables. (See Wires and Cables.)  
Carbon Brushes. (See Brushes,  
Carbon.)

Car Equipment. (For Fenders,  
Heaters, Registers, Wheels,  
etc.—See those headings.)

Car Trimmings. (For Curtains,  
Registers, Doors, Seats, etc.—  
See those headings.)

Car Panel Safety Switches  
Westinghouse Elec. & Mfg. Co.

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etc.

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Brill Co., The J. G.  
Cambria Steel & Ordnance Co.  
Kuhlman Car Co., G. C.  
Midvale Steel & Ordnance Co.  
McGuire-Cummings Mfg. Co.  
St. Louis Car Co.  
Wason Mfg. Co.

Cars, Second Hand  
Electric Equipment Co.

Cars, Self-Propelled  
Electric Storage Battery Co.  
General Electric Co.

Castings, Brass, Composition or  
Copper

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Anderson Mfg. Co., A. & J. M.  
Columbia M. W. & M. I. Co.  
Eureka Co.  
More-Jones Brass & Metal Co.

Castings, Gray Iron and Steel  
American Bridge Co.

Bemis Car Truck Co.  
Columbia M. W. & M. I. Co.  
St. Louis Car Co.  
Standard Steel Works Co.

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Amer. Brake Shoe & Fdry. Co.  
Bemis Car Truck Co.  
Columbia M. W. & M. I. Co.  
St. Louis Car Co.

Catchers and Retrievers, Trolley  
Earl, C. I.  
Electric Service Supplies Co.  
Holden & White, Inc.  
Kerschner Co., Inc., W. R.  
Ohio Brass Co.  
Wood Co., Chas. N.

Circuit Breakers  
The Cutter Electrical & Mfg. Co.  
General Electric Co.  
Westinghouse Elec. & Mfg. Co.

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and Cables  
Anderson Mfg. Co., A. & J. M.  
Electric Railway Equipment Co.  
Electric Service Supplies Co.  
Eureka Co.  
General Electric Co.  
Hubbard & Co.

Klein & Sons, Mathias  
Ohio Brass Co.  
Westinghouse Elec. & Mfg. Co.

Clamps, Insulator  
Philadelphia Electric Company  
Supply Dept.

Cleaners and Scrapers Track—(See  
also Snow-Plows, Sweepers and  
Brooms.)  
Brill Co., The J. G.  
Ohio Brass Co.

Clusters and Sockets  
General Electric Co.

Coal and Ash Handling—(See Con-  
veying and Hoisting Machin-  
ery.)

Coil Banding and Winding Ma-  
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Columbia M. W. & M. I. Co.  
Electric Service Supplies Co.

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Cleveland Armature Works.  
Columbia M. W. & M. I. Co.  
D & W Fuse Co.  
General Electric Co.  
Independent Lamp & Wire Co.  
Rome Wire Co.  
Westinghouse Elec. & M. Co.

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General Electric Co.  
Westinghouse Elec. & M. Co.

Coin-Counting Machines  
International Register Co., The

Commutator Slotters  
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General Electric Co.  
Westinghouse Elec. & Mfg. Co.  
Wood Co., Chas. N.

Commutator Slotting Files  
Handy Supply Co.

Commutator Stones  
Handy Supply Co.

Commutator Truing Devices  
General Electric Co.

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Cleveland Armature Works.  
Columbia M. W. & M. I. Co.  
Eureka Co.  
General Electric Co.  
Mica Insulator Co.  
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Allis-Chalmers Mfg. Co.  
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General Electric Co.  
Westinghouse Elec. & Mfg. Co.

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Johns-Manville Co., H. W.

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Eureka Co.  
General Electric Co.  
Johns-Manville Co., H. W.  
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General Electric Co.  
Westinghouse Elec. & Mfg. Co.

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General Electric Co.  
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Conveying and Hoisting Machinery  
American Bridge Co.  
Columbia M. W. & M. I. Co.  
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Electric Service Supplies Co.  
International Register Co., The  
Samson Cordage Works.

Cord Connectors and Couplers  
Electric Service Supplies Co.  
Samson Cordage Works.  
Wood Co., Chas. N.

Couplers, Car  
Brill Co., The J. G.  
Ohio Brass Co.  
Van Dorn Coupler Co.  
Westinghouse Trac. B. Co.

Cranes  
Allis-Chalmers Mfg. Co.  
Toledo Bridge & Crane Co., The  
Creosoting. (See Wood Preserva-  
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Cross Arms. (See Brackets)

Crossing Foundations  
International Steel Tie Co.

Crossing Signals. (See Signals,  
Crossing)

Crossings, Track. (See Track,  
Special Work)

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Allis-Chalmers Mfg. Co.

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Electric Service Supplies Co.  
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Electric Equipment Co.  
Foster Co., L. B.

Griswold Machine Co., Geo. M.  
Hyman Michaels Co.  
MacGovern & Co., Inc.  
Zelnicker Supply Co., Inc.  
Walter A.

Derailing Devices. (See also Track  
Work)

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Wharton, Jr., & Co., Wm.

Destination Signs  
Columbia M. W. & M. I. Co.  
Electric Service Supplies Co.

Detective Service  
Wish Service, Inc., P. Edward

Die Blocks  
General Steel Co.

Disconnecting Switches  
Philadelphia Electric Company  
Supply Dept.

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Williams & Co., J. H.

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National Pneumatic Co., Inc.

Safety Car Devices Co.

Doors, Asbestos  
Johns-Manville Co., H. W.

Doors and Door Fixtures  
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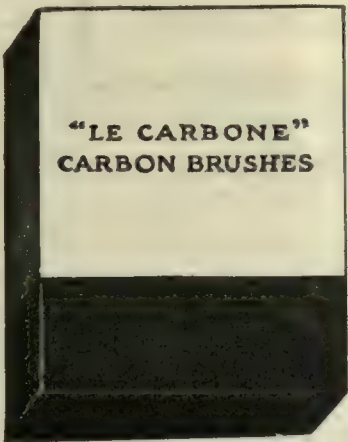
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Doors for Bus & Switch Compart-  
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Philadelphia Electric Company  
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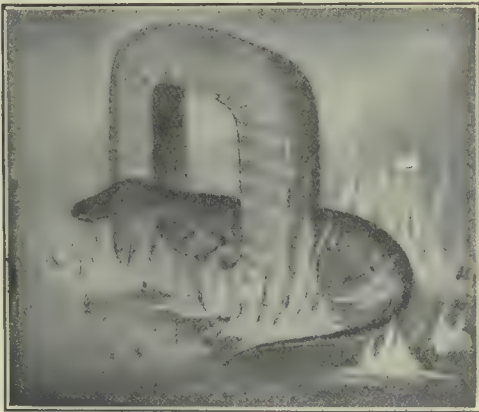
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Republic Engineers, Inc.  
Richey, Albert S.  
Sanderson & Porter.  
Scotch Engineering Co.  
Stone & Webster.  
Wells, Gardiner F.  
White Companies, The J. G.  
Woodmansee & Davidson Engineering Co.

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Allis-Chalmers Mfg. Co.  
Westinghouse Elec. & Mfg. Co.

**Engines, Steam**

Allis-Chalmers Mfg. Co.  
Westinghouse Elec. & Mfg. Co.

**Fare Boxes**

Brill Co., The J. G.  
Cleveland Fare Box Co.  
International Register Co., The  
National Railway Appliance Co.

**Fences, Woven Wire and Fence Posts**

American Steel & Wire Co.  
Page Steel & Wire Co.

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Cleveland Fare Box Co.  
Electric Service Supplies Co.  
Star Brass Works.

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Westinghouse Elec. & Mfg. Co.

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Scaife & Sons Co., Wm. B.

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American Mason Safety Tread Co.  
Johns-Manville Co., H. W.

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Eureka Co.  
Standard Steel Works Co.  
Williams & Co., J. H.

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D & W Fuse Co.  
General Electric Co.  
Johns-Manville Co., H. W.  
Westinghouse Elec. & Mfg. Co.

**Fuses, Refillable**

Columbia M. W. & M. I. Co.  
General Electric Co.

**Galvanizing**

Cattie, Jos. P. & Bros.

**Gaskets**

Johns-Manville Co., H. W.  
Power Specialty Co.  
Westinghouse Traction Brake Co.

**Gas Producers**

Westinghouse Elec. & Mfg. Co.

**Gates, Car**

Brill Co., The J. G.

**Gages, Oil and Water**

Ohio Brass Co.

**Gear Blanks**

Carnegie Steel Co.  
Standard Steel Works Co.

**Gear Cases**

Columbia M. W. & M. I. Co.  
Electric Service Supplies Co.  
Thayer & Co., Inc.  
Westinghouse Elec. & Mfg. Co.

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Columbia M. W. & M. I. Co.  
Electric Service Supplies Co.  
Kerschner Co., Inc. W. R.  
National Railway Appliance Co.  
Nuttall Co., R. D.  
Poole Eng. & Machine Co.  
Tool Steel Gear & Pinion Co.

**Gears, Reduction**  
Poole Eng. & Machine Co.

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General Electric Co.  
Generators  
Allis-Chalmers Mfg. Co.  
General Electric Co.  
Westinghouse Elec. & Mfg. Co.

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Standard Optical Co.

**Gongs. (See Bells and Gongs)**

Graphite  
Morgan Crucible Co.

**Greases. (See Lubricants)**

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Indianapolis Switch & Frog Co.  
Metal & Thermit Corp.

**Grinding Blocks and Wheels**

Railway Track-work Co.

**Grounding Boxes**

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Supply Dept.

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American Bridge Co.

**Guards, Trolley**

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Ohio Brass Co.

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Anderson M. Co., A. & J. M.  
Bayonet Trolley Harp Co.  
Electric Service Supplies Co.  
Holland Trolley Supply Co.

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Gold Car Heating & Lighting Co.  
Holden & White, Inc.  
Smith Heater Co., Peter.

**Heaters, Car, Hot Air and Water**

Cooper Heater Co.  
Holden & White, Inc.  
Smith Heater Co., Peter.

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Holden & White, Inc.  
Smith Heater Co., Peter.

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Ford Chain Block & Mfg. Co.  
Niles-Bement-Pond Co.

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Westinghouse Traction Brake Co.  
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General Electric Co.

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Drew Electric & Mfg. Co.  
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Johns-Manville Co., H. W.  
Mica Insulator Co.

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Standard Underground Cable Co.  
U. S. Rubber Co.

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Insulators. (See also Line Material)

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Columbia M. W. & M. I. Co.  
Drew Electric & Mfg. Co.  
Electric Service Supplies Co.

**Insulating Trolleys**

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Columbia M. W. & M. I. Co.  
Drew Electric & Mfg. Co.  
Electric Service Supplies Co.

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**Insulating Trolleys**

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Drew Electric & Mfg. Co.  
Electric Service Supplies Co.

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Electric Service Supplies Co.

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Westinghouse Elec. & Mfg. Co.

White Electrical Supply Co., T. C.

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Buckeye Jack Mfg. Co.

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Brill Co., J. G.

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General Electric Co.  
Westinghouse Elec. & Mfg. Co.

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Ohio Brass Co.

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Milburn Co., The Alex

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Eureka Co.  
General Electric Co.

Holden & White, Inc.  
Hubbard & Co.

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Ohio Brass Co.  
Westinghouse Elec. & Mfg. Co.

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Johns-Manville Co., H. W.

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Mica Insulator Co.

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 Nuttall Co., E. D.

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 Columbia M. W. & M. I. Co.  
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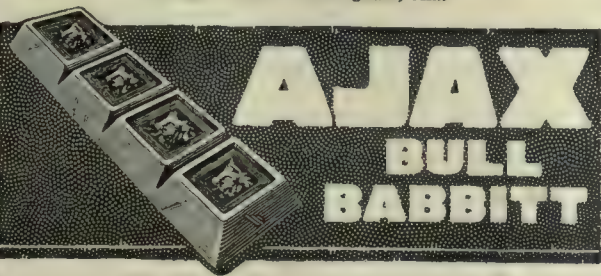
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Service in the Journal box of a heavy, high-speed car is one of the supreme tests of a ball bearing's ability to keep cool, which means no friction—

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The fact that Gurney Ball Bearings are successfully used in such service is proof positive that they meet the test satisfactorily.

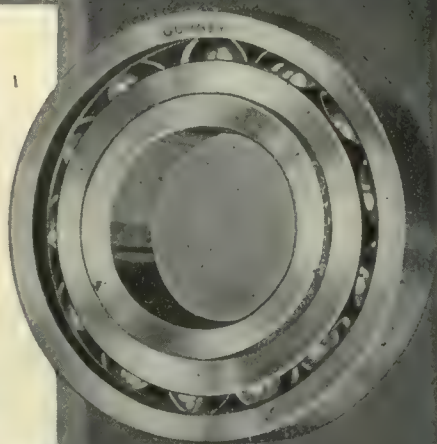
**Adopt these ball bearings and journal boxes for your cars and forget your bearing troubles.**

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255



# GURNEY



# If the Peter Witt Car could speak



HIS is what it would say:

I am the car for crowded cities.

My work is to carry men and women to their work in the morning and home again at night more quickly than ever before.

I can do it because my passengers enter or leave two at a time in a quick, uninterrupted stream. Then I am off again before an ordinary car would be half through taking on or letting off.

I gain minutes at the busy corners and seconds at other stops. I double the capacity of terminals.

The line where I operate must have no slow-coach. To keep up my pace my mates must be like me for I am a schedule reducer.

I am the car for double-quick service.

*The Front-entrance, Center-exit Car, with conductor at center, furnishes a loading area of practically one-half of the car. A car measuring 50 ft. over all, has a seating capacity of 56. Adaptable to multiple-unit operation. Always ready for one-man operation.*

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Mr. C. O. Birney—"This trade-mark is being placed on the doors of all of these cars. It identifies the car that has identified itself with the utmost in quality and quantity of service."

WHEN Mr. Birney first put the name "Safety" on his car, he evidently did so with a full realization that no matter how necessary to the welfare of the public and the railway companies a light-weight car adapted to one-man operation might be, it could never achieve success without achieving the highest degree of safety.

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# The G-E 258 In the Capital of Texas

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Before the introduction of the G-E 258, no motor was available to fill the duty requirements of light weight cars. Since its first installation the G-E 258, with its ventilating features, low weight and high capacity has more than made good in this line of railway work.

25-13



**General**  **Electric**  
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# ELECTRIC RAILWAY JOURNAL



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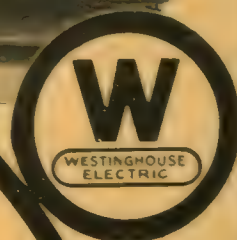
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# No 514 Motor

## The Standard Railway Motor

For the Textile and Mill Centers  
of the State of Maine

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Westinghouse Electric & Manufacturing Company  
East Pittsburgh, Pa.

# Westinghouse



# Electric Railway Journal

H. W. BLAKE, *Editor*

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### The Zone Fare in Practice in the City of Aberdeen

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A paper by Messrs. Potter and Dodd shows more railroad electrification and larger percentage of steam line electrified in America than in the rest of the world. Saving in coal, design of locomotives and current collection are subjects considered ..... Page 825

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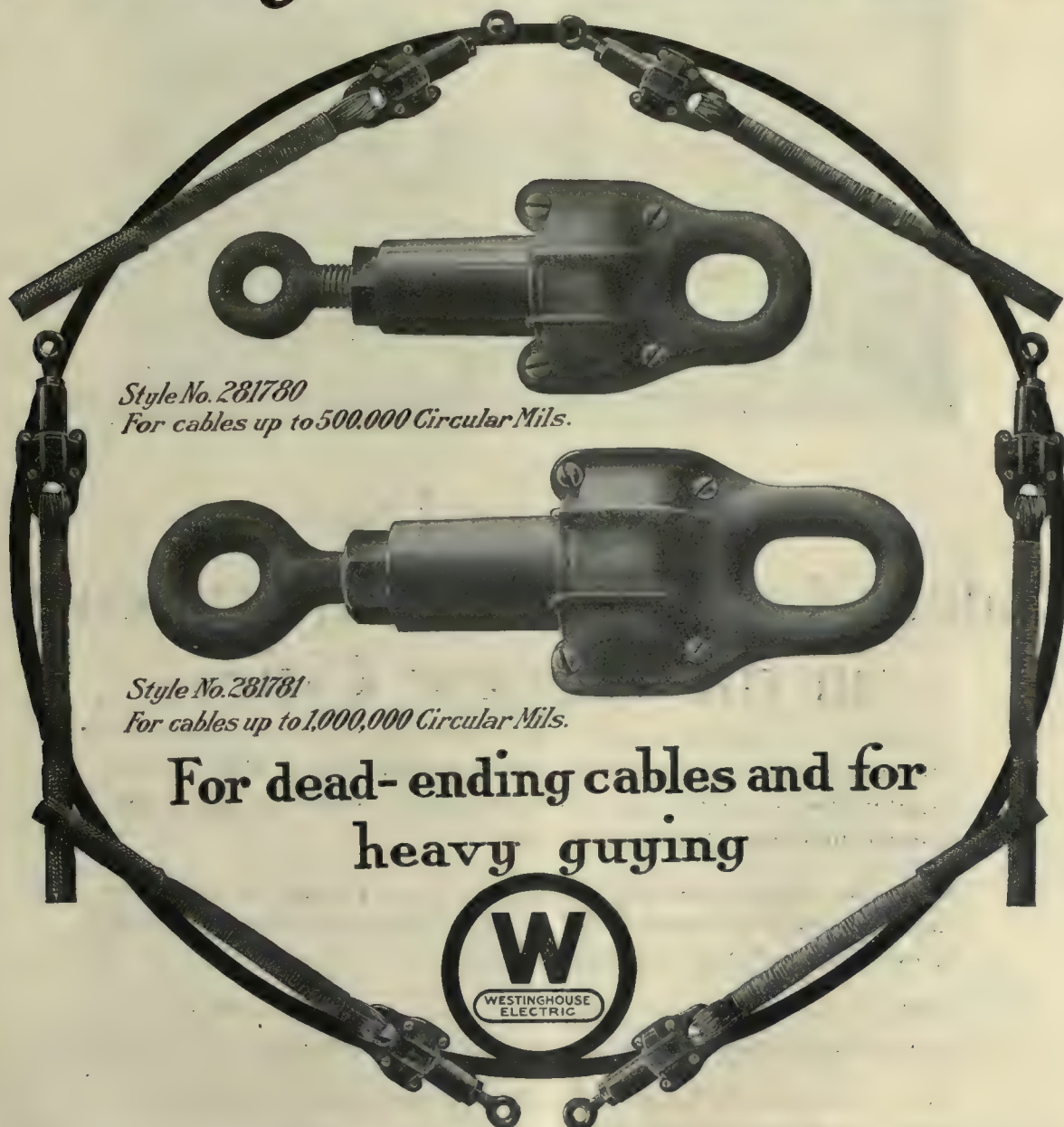


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# Westinghouse Brooklyn Strain Insulators



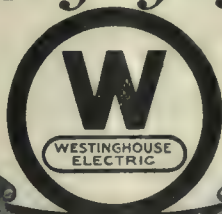
*Style No. 281780*

*For cables up to 500,000 Circular Mils.*

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*For cables up to 1,000,000 Circular Mils.*

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## You Can Use Safety Car Control Equipments in the Largest Cities

Fitting up either your new or old cars with Safety Car Control Equipments is just the same as adding safety speed-up and labor-eliminating devices to a machine tool.

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Every purchaser of Safety Car Control Equipments is a booster for them. May we state the reasons?

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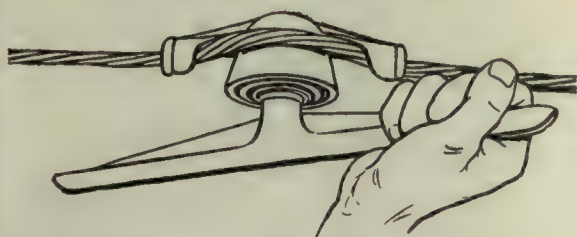
# PRODUCTS

*Quality First*



Usually the ear is out of line with the trolley wire when it first makes contact with the hanger.

**With Ordinary Hanger—**

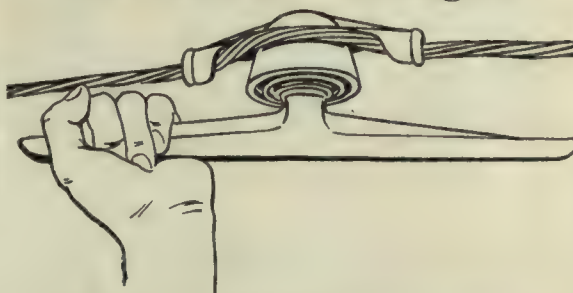


the ear must be backed off—



which leaves a loose joint between ear and hanger.

**With O-B Lock Hanger—**



the ear is turned still further and makes a



tight, solid joint between lock hanger and ear when the latter comes in line with the wire.

## That Internal Lock Washer Does It

Tight, weatherproof joint between every ear and every O-B Lock Hanger cuts your maintenance cost. With the ordinary hanger there is almost always a destructive see-saw action which sooner or later strips the sturdiest threads.

This never occurs with O-B Lock Hangers. In addition they have all the essential mechanical and electrical characteristics.

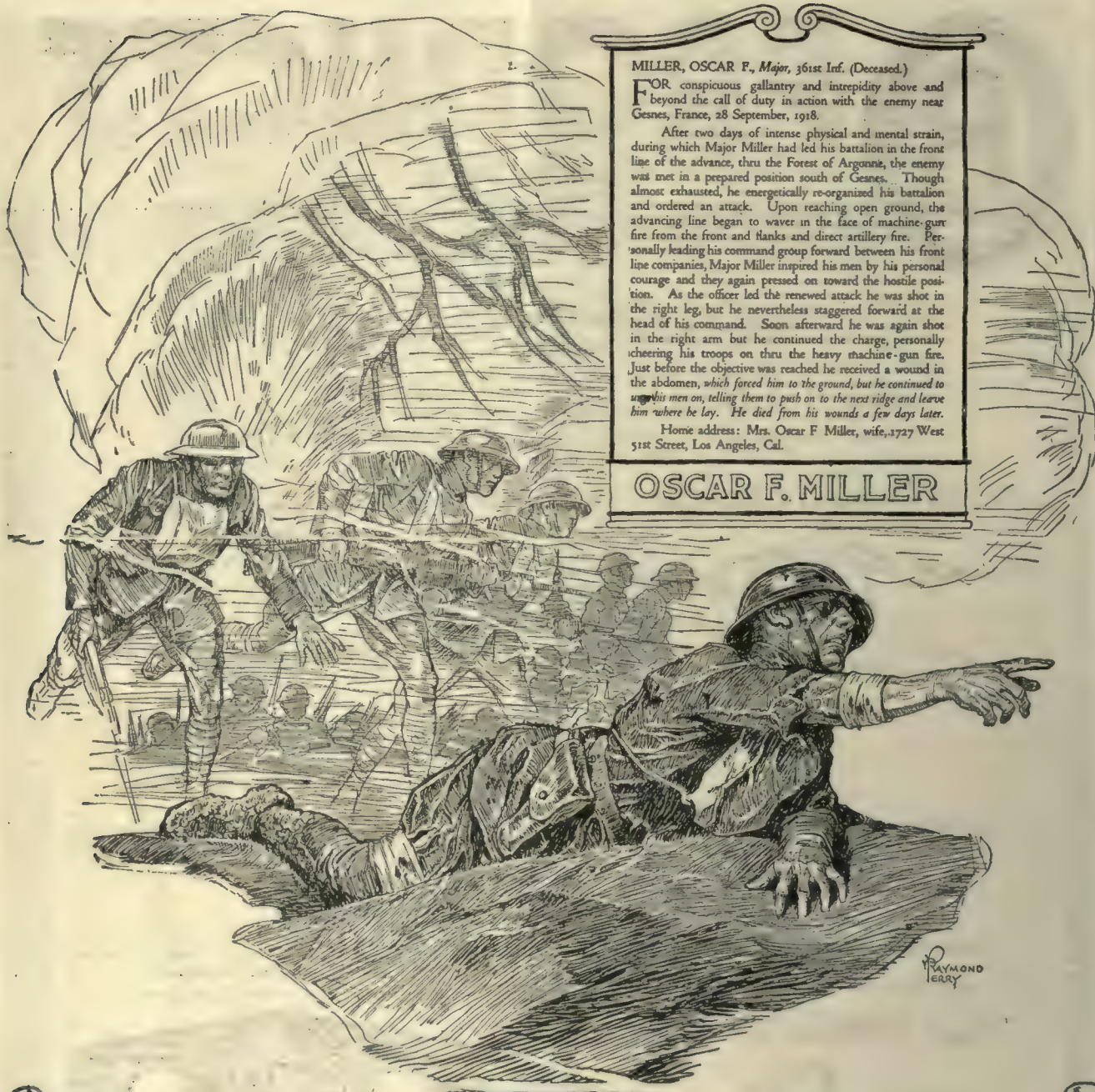
There are different sizes and types shown in O-B Catalog No. 17.

**The Ohio Brass Company**

Mansfield, Ohio







MILLER, OSCAR F., Major, 361st Inf. (Deceased.)

FOR conspicuous gallantry and intrepidity above and beyond the call of duty in action with the enemy near Gesnes, France, 28 September, 1918.

After two days of intense physical and mental strain, during which Major Miller had led his battalion in the front line of the advance, thru the Forest of Argonne, the enemy was met in a prepared position south of Gesnes. Though almost exhausted, he energetically re-organized his battalion and ordered an attack. Upon reaching open ground, the advancing line began to waver in the face of machine-gun fire from the front and flanks and direct artillery fire. Personally leading his command group forward between his front line companies, Major Miller inspired his men by his personal courage and they again pressed on toward the hostile position. As the officer led the renewed attack he was shot in the right leg, but he nevertheless staggered forward at the head of his command. Soon afterward he was again shot in the right arm but he continued the charge, personally cheering his troops on thru the heavy machine-gun fire. Just before the objective was reached he received a wound in the abdomen, which forced him to the ground, but he continued to urge his men on, telling them to push on to the next ridge and leave him where he lay. He died from his wounds a few days later.

Home address: Mrs. Oscar F. Miller, wife, 1727 West 51st Street, Los Angeles, Cal.

OSCAR F. MILLER

## AMERICA'S IMMORTALS

We owe it to Miller and to the thousands who went down to death on the blood-stained fields of France to go through with this Victory Liberty Loan as Americans should.

Victory Liberty Loan Committee

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### INTERNATIONAL STEEL TWIN TIES

Street traffic loads require a foundation slab of concrete on average soils about 5 inches thick.

With Steel Twin Tie Track it is possible to carry track and paving loads on a 7" slab of concrete, because the concrete is placed in bearing  $5/16$  of an inch under the base of the rail and the load is distributed over an area that shows a big factor of safety—10 times that required with 25 ton cars figuring concrete in compression at 250 per square inch.

Consequently Steel Twin Tie Track is carrying 65 ton interurban equipment and heavy vehicle traffic in ten large cities in the United States.

We want only the opportunity to apply the money saving principles of Steel Twin Tie construction to your particular problem.

Conventional designs bring conventional results. You know what they are.

A short note or wire will bring a concise statement of the progressive possibilities of Steel Twin Tie Track.

Rehabilitating  
double track  
on Broadway,  
Cleveland, Ohio

# The International Steel Tie Company

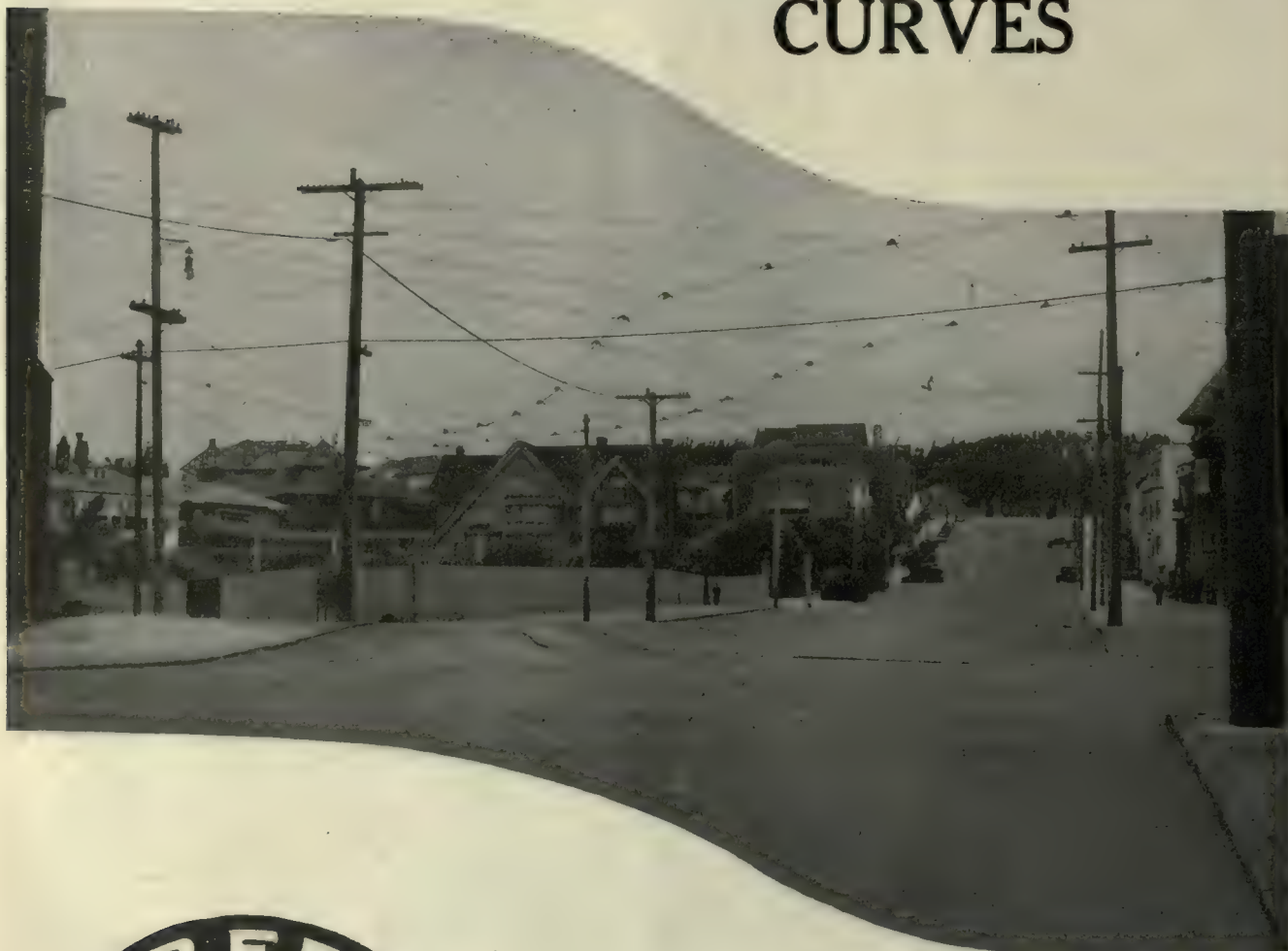
Manufacturers of Steel Twin Ties and Crossing Foundations

General Sales Office and Works: Cleveland, Ohio



# Phono-Electric

is not phased by **REVERSE CURVES**



Real Patriots Will Wear This

This reverse curve at Arguello (First) Avenue and Sacramento Street, San Francisco, is wired in No. 00 round Phono-Electric Trolley Wire.

Curves are nasty places for trolley wire wear. Only a tough, durable, uniform wire should be used at such locations if long, unbroken, economical service is wanted.

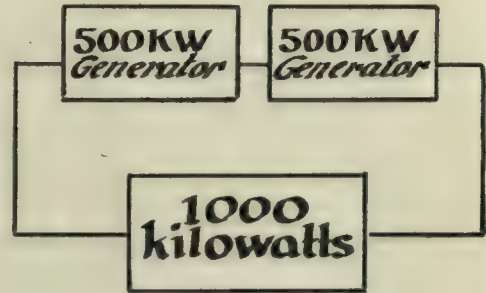
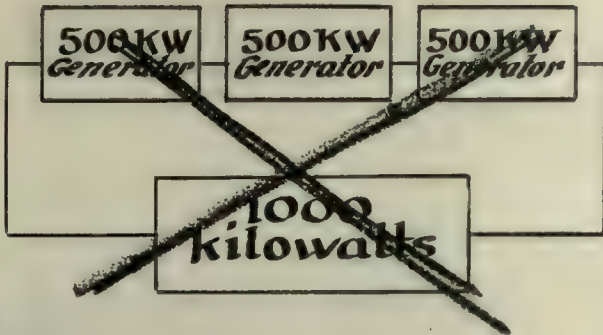
That tough, durable and uniform wire for curves and other jobs is

**PHONO-ELECTRIC**

**Bridgeport Brass Company**  
**Bridgeport** **Connecticut**



# SAVED: 500 Kilowatts



with

## “Protected” Rail Bonds

In a large city, on one division eleven miles long, 1500 kilowatts were necessary to supply sufficient power for operation. This required the service of three 500 kilowatt generators.

When this division was rebonded, it was found that two of the 500 Kw. generators were more than ample to carry the load.

Just think of it. 500 Kilowatts continually going to waste under the old system simply to overcome the resistance of a poorly-bonded track return.

This is only *one* of the losses directly traceable to poor bonding. When voltages become lower and lower and power costs increase, test out your track return. Then let us prove to you that we can keep that voltage high and reduce your power costs with “Protected” Rail Bonds.

*The Bond with the “Shot-Over” Sleeve*

## ELECTRIC SERVICE SUPPLIES Co.

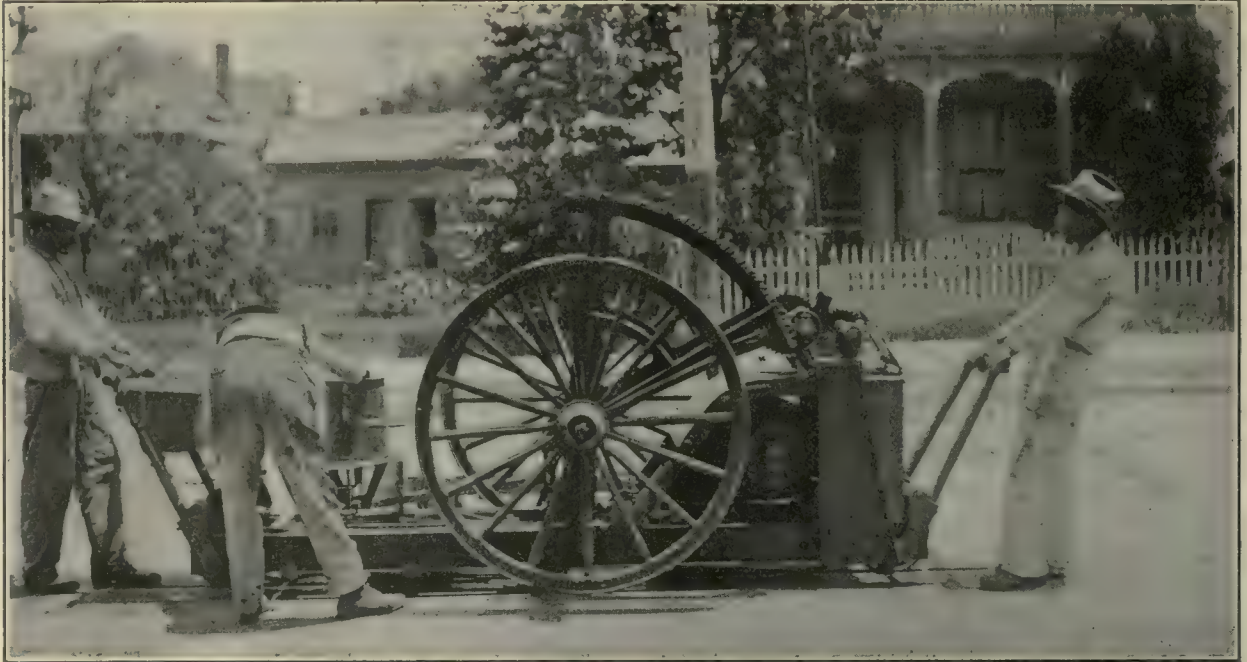
*Manufacturer of Railway Material and Electrical Supplies*

*We paid to send them over,  
now let's pay to bring them  
back. Invest in the Victory  
Loan.*



PHILADELPHIA      PITTSBURGH      NEW YORK      CHICAGO  
17th and Cambria Streets    335 Oliver Building    50 Church Street    Monadnock Building





## 15 to 40 per cent increase in track life by keeping joints smooth

The engineer of maintenance of way of a large traction company said some time ago:

"If we start with the new track and keep the joints planed we will increase the life of track from 15 to 40 per cent and at the same time will effect a saving in the cost of making repairs which will be necessary if the track is allowed to just 'run along.'"

## Reciprocating Track Grinders

provide an efficient and economical means of grinding joints in newly laid track to a perfect condition of smoothness, of grinding out "cups" which may later appear at joints and of eliminating rail corrugations wherever that disease appears.

An increase of even 15 per cent in the life of track means a big return on the relatively small investment necessary for track grinding. Besides which there are many other advantages in keeping track in continuously good condition.

**RAILWAY TRACK-WORK COMPANY**

30th and Walnut Sts., Philadelphia



They finished their job  
You finish yours

Buy  
Victory Loan  
Bonds



"Chicago Pneumatic"  
Products

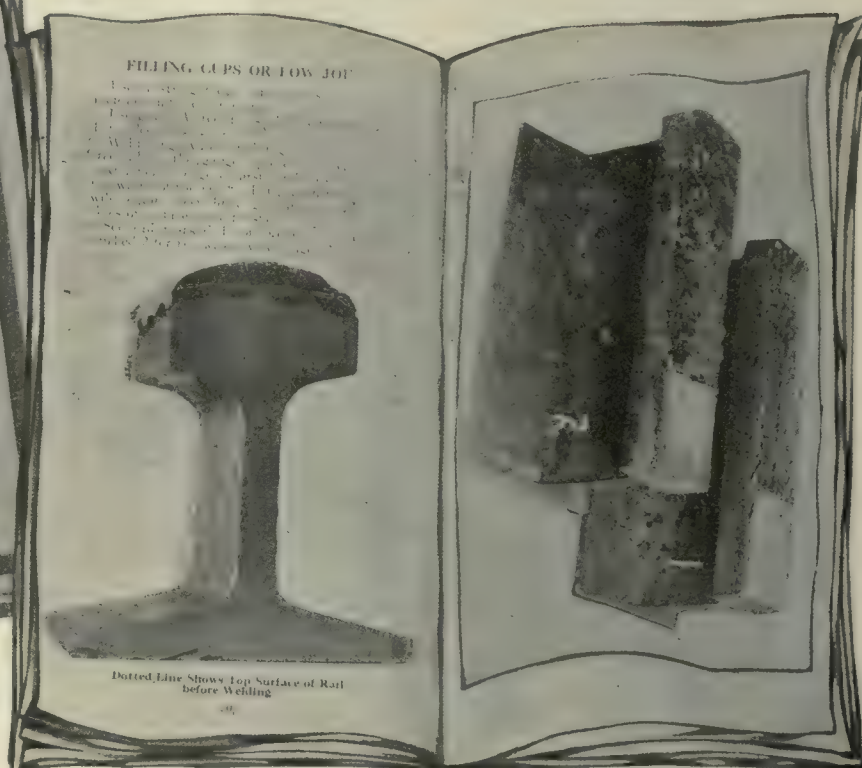
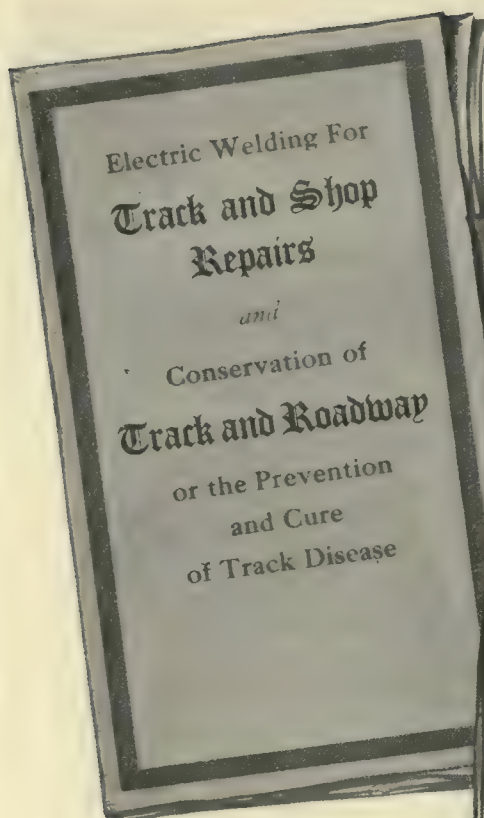
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Rock Drills

**"CHICAGO  
PNEUMATIC"**

*Depend upon that Name*



# In Your Files?



## The Kind of Data You Want On ELECTRIC WELDING Applied to Track and Rolling Stock

The welding art has received a tremendous impetus from conditions resulting from the recent war. Most of the repair work, undertaken chiefly to keep cars and equipment in service, has been found to result in *real economies*. Many railways will continue welding repairs even should steel and iron reach to low level of pre-war times. It is in line with the keen interest of engineers in this field that we have published the above 50-page book on **ELECTRIC WELDING in Track and Shop Repairs**. This book covers several

different methods of electric welding in the treatment of cupped joints, jointing and bonding of city and interurban track—(both Tee and Girder Rails), building up special work, manganese, shop welding, scleroscope tests, electrodes and welders. It is fully illustrated with detail photos of actual cross-sections and embodies diagrams, test results, cost figures. Practical men will find it of excellent value—the coupon saves time in sending for *your* copy.

*Send the Coupon below to*

**Indianapolis Switch & Frog Company, Springfield, Ohio**

Gentlemen:—Send me—copies of your 50-page booklet, entitled "Electric Welding for Track and Shop Repairs."

Name.....

Title.....

Address.....

.....





## Heavy trains have rolled over this culvert on four tracks for 11 years—

—and it is in as perfect condition today as when it was installed in 1908. It is only one of many Armco Iron Culverts that have been in service for ten years or more.

## "ARMCO" IRON CULVERTS

Note how near this culvert is to the rails. Every train that has passed over these four tracks during eleven years has dealt this culvert sledge hammer blows. Yet today it shows no evidence of deterioration.

It is proofs like this which make Armco Iron Culverts the choice where *permanence* is demanded.



There is a manufacturer in nearly every state and in Canada, making genuine rust-resisting ARMCO IRON CULVERTS and other products of ARMCO IRON such as flumes, siphons, tanks, road signs, roofing, etc. Write for full information and nearest shipping point on products in which you are interested.

**ARMCO IRON CULVERT & FLUME MFRS. ASSN.**  
**TRANSPORTATION BLDG. CHICAGO**



# "Sergeant Burr Speaking, Sir"

## STRAIGHT FROM GERMANY

An advertisement originated and produced for the Victory Liberty Loan by members of the American Expeditionary Force.

THE war's over, but—  
"Sergeant Burr speaking, sir."

It happened on the drive from the Ourcq to the Vesle. The kid had just been made a Sergeant and hadn't time to sew his new chevrons on before he was sprawling on the ground out in No Man's Land just before dawn with a squad of signal corps men. His job was to set up and maintain communications, under the German machine-gun fire, until his unit advanced. It had been an anxious half-hour at regimental headquarters before the buzzer rang.

"Sergeant Burr speaking, sir."

Everybody safe? None of them safe, but they were all right. How far had they gone? As far as their wire would reach. Where was Fritz? About a hundred yards away. What was he doing? Throwing over shrapnel and gas, and taking pot shots with machine-guns. A big bunch of machine-guns, according to Sergeant Burr. As it turned out later, there were 18 nests of them in one little patch of woods.

At the end of his report, Sergeant Burr was directed to station one man at the telephone, with instructions to

call up every five minutes, then to take the other six and make for the nearest shelter.

An anxious five minutes passed. The telephone buzzed.

"Sergeant Burr speaking, sir."

"I thought I told you to take cover; what are you doing there?"

"I'll be hanged," said Sergeant Burr, "if I'll ask any man to stay in such a place as this. No other change, sir."

So it was Sergeant Burr who made the reports every five minutes in order that regimental-headquarters might know that the wire was still open.

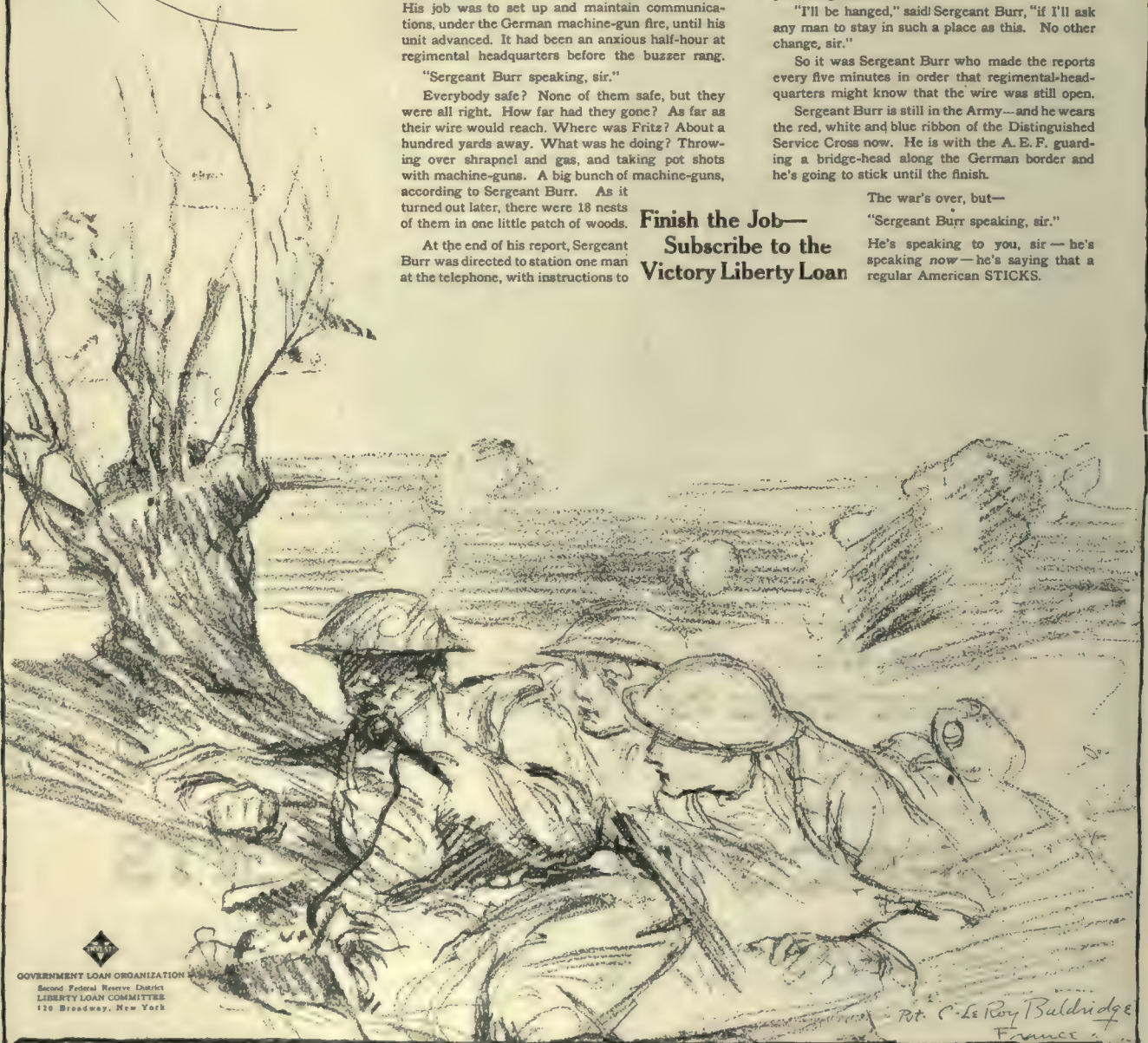
Sergeant Burr is still in the Army—and he wears the red, white and blue ribbon of the Distinguished Service Cross now. He is with the A. E. F. guarding a bridge-head along the German border and he's going to stick until the finish.

The war's over, but—

"Sergeant Burr speaking, sir."

He's speaking to you, sir—he's saying that a regular American STICKS.

**Finish the Job—  
Subscribe to the  
Victory Liberty Loan**



GOVERNMENT LOAN ORGANIZATION  
Second Federal Reserve District  
LIBERTY LOAN COMMITTEE  
120 Broadway, New York

# Victory Liberty Loan

Space Contributed by

ELECTRIC RAILWAY JOURNAL





## Economy Railway Power Saving Meters

will hereafter be sold in eastern territory comprising the Atlantic Coast States by the

**National Railway Appliance Co.**  
50 East 42nd Street, New York

This strong organization has made engineering service a factor in building the prestige which it enjoys.

The same service will now be available to the many users of Economy Railway Power Saving Meters.

This will now supplement the work we are doing to help every customer get the most out of his investment in Economy Meters.

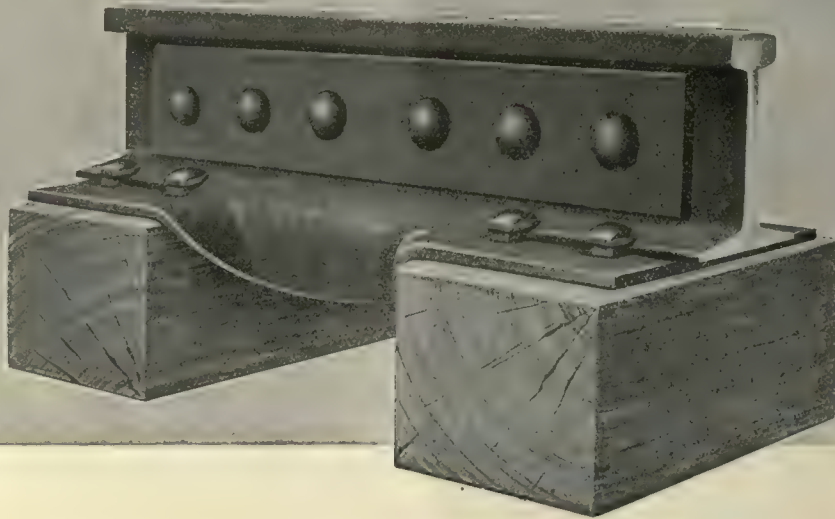
*Meter the Energy, That's What You Want to Save*

**Economy Electric Devices Company**

General Sales Agent: Sangamo Economy Railway Meters  
Old Colony Building, Chicago



## For PERMANENTLY good rail joints, weld FLAT-ENDED ABBOTT PLATES to the rail bases



This recently developed and inexpensive joint construction for use especially with high T or girder rails laid in paved streets consists in welding the Flat-ended Abbott Plate to the rail flanges and riveting the splice bars to the web.

Standard high T splice bars which fit the fishing angle, or plain flat bars having no contact with head or flange of rail, may be used with perfect safety, as the bars do not carry any of the load. The welding is easily accomplished without the use of expensive equipment and may be applied only to the part of the rail base between the ties or may extend the entire length of the plate.

Track equipped with this type of joint gives full sectional contact of the rail ends, maintains its surface perfectly and the rail ends are held together so tightly that the joint becomes invisible on the wearing surface. *The welding gives an absolute electrical bond and eliminates the necessity of special bonding.*

The flat end surfaces of this type of Abbott Plate leave the joint clear so that the paving can be made to fit up against the track without having to use special blocks or bricks.

This and other shapes of Abbott Rail-Joint Plates are fully described and illustrated in our booklet "*Improved Track Appliances*," which will be sent on application.

311



**Lackawanna Steel Company**  
LACKAWANNA, N. Y.

ATLANTA  
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BUFFALO  
CHICAGO  
CINCINNATI  
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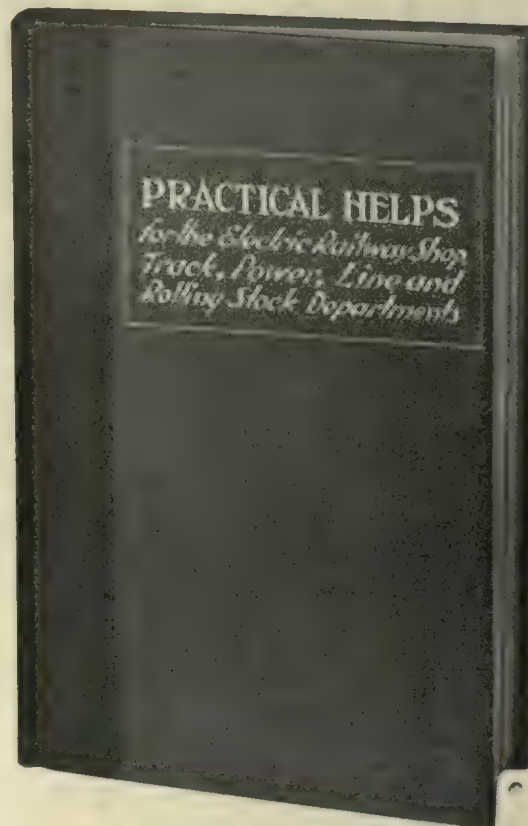
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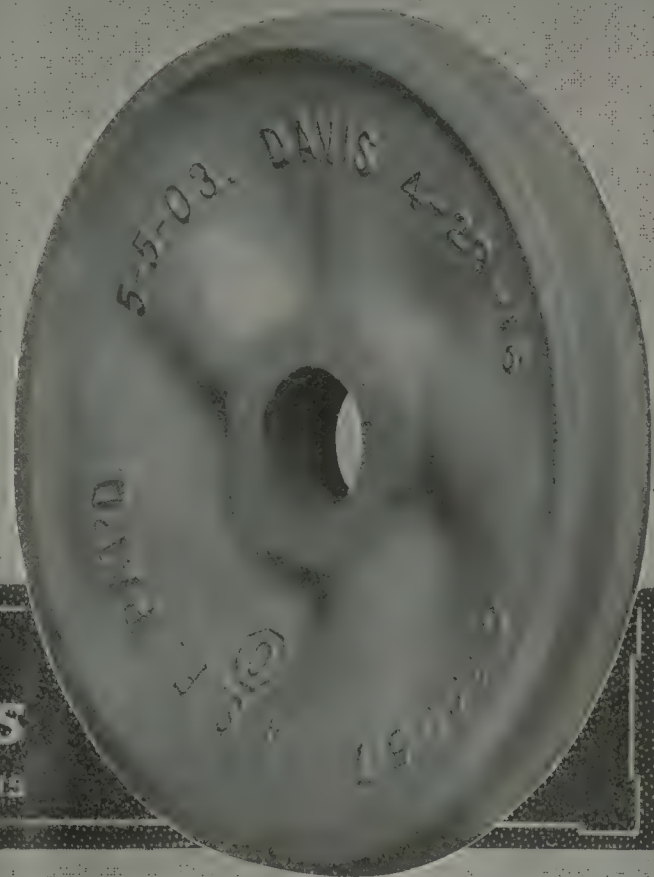
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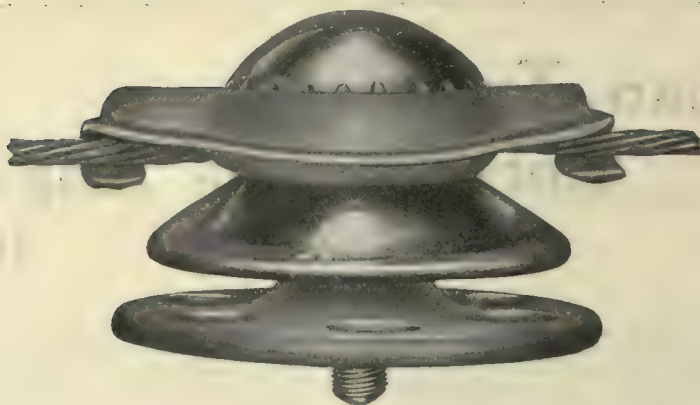
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# Electric Railway Journal

Consolidation of STREET RAILWAY JOURNAL and ELECTRIC RAILWAY REVIEW

Volume 53

New York, Saturday, April 26, 1919

Number 17

## Feel an Individual Responsibility for the Victory Loan

EVERYONE was happy on Nov. 11 last, when the armistice was declared. The war was over and the principles for which we entered it were safe. But the signing of the armistice did not end our part in the conflict for liberty. The success of the Victory Loan is the most immediate duty which remains. We must see it through, and this can be done only if each person responds so far as he, or she, can, as with the preceding loans. It is this appeal of Liberty to the country to keep the faith, which is pictured in our colored insert of this week. We must make certain that the fruits of victory are not only won but kept, and this can be done only by strengthening our national treasury, by stimulating business, by placing our utilities on a firm foundation and by co-operative effort in all directions by which this country may recoup through industry and thrift the losses which it suffered through the war.

Do you wonder why we mention all these points together? Simply because national prosperity demands not only that the Victory Loan be taken up, but even more that it get without delay into the proper hands. The loan will not benefit the country to the highest degree, unless the bonds are widely distributed in the hands of the public. The banks must not be expected to provide all the funds.

The member banks of the Federal Reserve System alone had at the end of 1918 more than 20 per cent of their total loans and investments (exclusive of fixed investments) tied up in United States war paper. The amount of such paper, of course, has a direct effect upon the current rates of interest for commercial loans. Hence, if the banks are to finance at reasonable rates the public utilities and the scores of other businesses which urgently need development, the public should not compel the bankers to tie up several billions more in government securities.

Through the co-operation of the banks, their depositors and the general public can take the greater part of the Victory Loan and pay for it out of a year's income. Such assistance the banks can and will gladly give, but the public must do the rest. Help restore the nation's prosperity while paying its bills.

## Brighten Up the Shop Grounds With a Bit of Color

MEN who work in the electric railway shop or power house are just as human as those who work in starched linen and spend their time in swivel office chairs. Being human they like flowers and will work better when they associate their work with the attractiveness of a garden, large or small as the circumstances permit. This fact needs no argument. Why is not more done in a practical way to exemplify it?

In last week's issue of this paper a short article was printed giving some detail of what the Schenectady Railway is doing to beautify the plots on which its substations are situated. This work is the result of the conviction and persistence primarily of one man, but the whole organization is pleased to co-operate with him and all are proud of the result. Here then is the first requisite—some one who will make it his job to put a planting scheme across. A volunteer, in general, will get the best results. The second thing is to have a plan, which might well be prepared in co-operation with all the flower lovers available. When such a plan is made well ahead of requirement, the plants cost little. Finally, persistence in caring for the plants must be insisted on. Plants are sensitive to care; they respond marvelously to intelligent attention.

Let's make the waste spaces around the railway buildings blossom this year as a sign of gratitude for victory and peace, if for no other reason!

## Are There Any Mitigations to a Receivership?

AS RECEIVERSHIPS are becoming more common among electric railways it is worth while to consider whether there is any bright side to such a condition. In the first place, a company which goes into the hands of a receiver is at least freed from that mocking phrase: "The worst is yet to come." When the courts take charge the crisis has arrived. The public is brought up with a sharp turn to a realization of the fact that the railway's cries of "Wolf, wolf" were true after all; stockholders begin to see that loss of their equity is worse than postponement of dividends, and employees are sobered by the prospect of a reduction in staff if not the disbanding of the force and the dismembering and sale of the property.

The receiver comes to his task armed with powers vastly in excess of those possessed by the most able and courageous manager. He is armed to cut through prejudice, politics and precedent instead of going around them or of standing at bay among a host of conflicting interests. He can postpone a thousand and one litigations if it appears that the money can be spent otherwise to better immediate advantage.

One would expect that a receiver would retain the local executive as his right arm. Yet this is not always the case, although that fact is not necessarily a reflection upon the manager retired. It is his misfortune not his fault if he has been obliged to act against his personal judgment in refraining from giving more service or carrying out other reforms. Likely enough when the receiver arrives he will find that the manager long became discouraged in making suggestions to an obdurate board of directors. As a result, the local public will not have the necessary faith in his promises even under



a receivership, unless backed up or inaugurated by other men who come well recommended.

This accounts for the rise of the electric railway expert or consultant. He is the specialist where the local manager is the family physician. He comes to the task equipped with experience in handling certain types of railway disease among a large number of patients. Like the receiver, he is not bound by local conditions nor has he been so close to the daily detail drudgery that he cannot see the possibilities of economy in cost or of increase in traffic. The greatest traction expert in the world would soon lose his usefulness, if within five minutes he had to advise a foreman how to wire some lamps and then confer with a banker over the telephone on the meaning of a million-dollar wage increase! Therefore, a wise receiver will not only secure the benefit of specialists but will insist that the executive of the recovered property be given powers that will permit him to leave the smaller things to smaller men.

### Keeping the Mind Focused on Transportation Fundamentals

NEVER in the history of the electric railway industry have there been so many plans for improving electric railway service and putting the whole business on a more rational basis than at present. Scheme follows scheme with such rapidity that unless the few fundamentals are held clearly in mind confusion is apt to result. These fundamentals are that the public desires to be transported with the greatest possible frequency and speed, in comfort and safety, and at a reasonable cost. As a standard in determining these things it will use a combined picture of all other available means of transportation. Many times undoubtedly this standard, which will vary somewhat in the minds of different individuals, will be set higher than it is possible for the electric railway to attain. It is then obviously the duty of the electric railway, while endeavoring to meet the highest ideals of service, to explain the real situation to the public. While the explanation is being given, every effort will naturally be made in the line of reducing headway, increasing schedule speeds, providing more comfortable and more sanitary cars, operating these cars more smoothly and at the same time keeping operating costs at a minimum. These things being done it will be possible in the long run to prove the case of the railways for a reasonable rate of return on its investment of money and effort.

Of course, where the fares are inadequate, it is impossible for a railway to do as much in the way of improving its service as it would like. Nevertheless, there are certain directions in which it can work which will be of benefit both to the public and itself. Thus, changes in the direction of shorter headway of cars will encourage people to ride who otherwise would walk, will reduce loading time because fewer people board each car, will help to keep tracks clear of conflicting traffic because drivers of vehicles realize more clearly that the tracks are primarily for the railway, etc. Higher speed permits the same service to be given with fewer cars or more service with the same cars. Higher speed is the result of various factors, including efficient use of well-selected equipment which in turn tends to economy in energy, and elimination of unnecessary stops, which again results in energy economy, etc. Attention to the comfort of passengers attracts business because the well-ventilated, well-seated car affords rest to the pas-

senger as well as transportation. Application of safety principles is reflected in the accident claims account, a possible source of very great financial saving and of improvement in public relations.

Almost any railway can afford to go to considerable length in the directions mentioned without exhausting the possibilities of giving better service at less net cost, considering cost in the broad sense with due regard to the purchasing value of the dollar.

### The Public Suffers When Justice to Utilities Is Denied

WHEN will the public learn that it is really concerned with the financial conditions of public utility corporations? When will it cast aside its cloak of indifference and cease to make light of the troubles of these companies with the typical American remark of "We should worry?" F. H. Sisson of the Guaranty Trust Company of New York put this situation very clearly in an address, abstracted last week, when he showed that direct interest in the welfare of such corporations is not limited to those who are stockholders in the companies, because the solvency of many banks and insurance companies—which means millions of individuals—is dependent on the protection given to public utility securities which are included in their assets.

One is naturally forced to reflect seriously on this situation when hearing of financial disaster overtaking the great transportation agencies of the country. The latest big company to be added to this list is the United Railways of St. Louis. This corporation, with an investment of more than \$100,000,000 in road and equipment, passed into the hands of a receiver last week after a hard struggle to meet expenses with a 6-cent fare.

It is possible to dwell at length on the conditions which brought about this calamity, but the story has now become an old one. We think a better lesson can be learned from considering the prospects confronting the industry as a whole. No one property need be taken as an example, because with few exceptions a similar lesson is impending in all the larger cities. This being true, it is no cause for wonder that the people do not grasp readily at opportunity for municipal ownership. The voters of Detroit doubtless had this in mind when they refused to sanction the taking over of the local transportation system even at a reduced purchase price.

The authorities of St. Louis had a chance about a year ago to make a fair settlement for renewal of the railway franchise, but after long months of bickering the best offer they could agree upon fell short of meeting the basis which would be accepted by the security owners. In Chicago, too, the people had an opportunity not long ago to approve an ordinance which would have assured improved transportation at actual cost. They rejected the compromise terms, and while the company still has some eight years of life under the present agreement the people are not getting the service which would have been made possible on the other basis. Instead, we understand that a certain political element has started to cloud the real issue by suggesting the advisability of building a separate rapid transit system to be paid for out of the city's traction fund. The prospect sounds attractive, but as usual the important fact is being held back from the public that a separate system means a separate fare and that the existing



rapid transit lines cannot be forced into an arrangement which would give the advantages of unified service. In New York, in a similar way, the receivership of the surface lines naturally suggests a segregation of the underlying properties with a new fare every time a passenger changes to a different line. This would be one way of effecting an increase in fare, though perhaps an inconvenient one to the public. If the issue of universal transfers was an obligation of the consolidated company, the insolvency and dissolution of the company removes that obligation. Any enforced extension of the transfer system then to the underlying companies is a burden added to their original charters, for which they should receive compensation.

The moral in the several cases cited above is the same. It means that co-operation is needed in order to get the best results. Both parties to these disputes can get along for a time without a harmonious settlement, but in the end—for the benefit of the public as well as the companies—all will have to do what should have been done years ago, namely, bury all prejudice and get together for the common good.

### No One Can Really Desire to Lose His Hundred Rides

THE frightened bather who suddenly finds himself carried beyond his depth is not likely to be overjoyed to hear a voice from the shore yelling: "The danger began five minutes ago when you were 20 yd. out, and it has been getting 20 per cent greater every minute." In such a crisis the bather wants a lifesaver rather than statistics.

In the present critical electric railway situation such may well be the frame of mind of many a company in regard to an analysis of the 1917 statistics just compiled by the Bureau of the Census. These statistics will not of themselves save the railways from destruction. Nevertheless, they are capable of performing invaluable service along two lines—they can prove to the public that the railways should not be blamed for their present lamentable position, and they can emphasize the fact that the railways are worth saving. Consequently we would direct particular attention to the preliminary census figures for the period 1907-1917 reproduced elsewhere this week.

During this decade the electric railways of the United States did their best to make both ends meet. The industry grew, to be sure, but its income advanced at a declining rate and its expenses rose at a greater and an increasing rate. Of the \$300,353,786 or 69.9 per cent gain in income from all sources for the decade, \$156,186,263 arose in the first five years, but of the \$201,285,402 or 80.1 per cent advance in operating expenses \$119,698,298 came in the second five years. The operating ratio in 1917 at 63.7 per cent was considerably greater than that of 58.7 per cent in 1912, and it even ran higher than that of 60.1 per cent in the first year of the decade.

The miles of single track gained only 3746 or 6.9 per cent in the second half of the decade as compared to 6683 or 19.1 per cent in the first half, and the passenger cars only 3752 or 4.9 per cent as compared to 6146 or 8.8 per cent. This restricted expansion of the industry was but the inevitable result of its lessened earning power, but still the industry was trying to do its full duty to the general public. It succeeded in largely checking the great increase in free riders of

the first five years, although the transfer traffic advanced more rapidly and for the decade kept pace in rate of increase with the revenue traffic. Moreover, the industry increased its output of revenue car-miles at a greater rate in the second five years than the cars and the number of employees, in spite of the considerably greater increase of expenses over these items and over income as well.

The detailed statistics in general speak for themselves, but two individual items may well be mentioned. Owing to differences in the accounting classifications a strictly comparable figure for taxes is not presented, but, as explained elsewhere, the minimum increase over 1912 was \$10,728,730 or 30.7 per cent. The other item is wages. That the present heavy wage burden had its beginnings some time ago is indicated by the fact that from 1907 to 1917 the salaries and wages increased more than twice as rapidly as the number of employees, and from 1912 to 1917 more than six times as rapidly. And this in an industry where during the decade the salaries and wages have averaged about 60 per cent of the operating expenses!

What will the next census show? One would dread to think of it were he not confident that the public must see the vital necessity of giving adequate support to the electric lines. More than eleven billion revenue passengers in 1917—such a figure may not mean much to a public which is now much bored by war figures less than trillions. But here is a simple figure which tells a great story—electric railways in 1917 provided 100 trips for every man, woman and child in the United States. What other public industry comes closer to the daily life of each individual, or has had a more beneficial effect upon community life and prosperity? The electric lines must be preserved.

### Courtesy by Employees Pays Both Company and Man

SEVERAL times recently we have advocated editorially the importance of utilizing employees' co-operation in promoting general good-will. We have been trying to convince railway men that they may be overlooking their best publicity medium in failing to use the platform employees to spread information about the company and to create a favorable public opinion.

And now comes a news item from Chicago to the effect that one of the older conductors on the Surface Lines, familiarly known as "Mike," and beloved for his courtesy, had died. The point of the story which interested us was that by his politeness and kindness he won the affection of hundreds of men, women and children passengers and that a large floral offering from these friends was conspicuous at the funeral. It was related in the daily press that on a rainy day he was known to signal for his motorman to stop the car in places where there was no mud or water, so that the dresses of the women would not be soiled.

What a wonderful place for making friends for the company is the platform of the car! What a force in the community would be the public utility company which could boast that a large percentage of employees were men who were popular with their patrons! It is not impossible to achieve this result, and the executive who can surround himself with a loyal force of employees, actively at work for the good of the management, need have no worries about the final outcome in matters in which popular favor counts for much.



# The Zone Fare in Practice

## ABERDEEN

**The Combination of Zone and Universal Fare Used in This City of 165,000 Stimulates Both Short-Haul and Long-Haul Riding—  
Why an Average of More Than Eighteen Passengers per Car-Mile Has Been Obtained in a City Built Up Along American Lines of Housing**

By WALTER JACKSON

THE visitor to Aberdeen who expects to find either cold or fog in winter because of its extreme northerly location is pleasantly surprised at the mildness of its January days in comparison to British cities much further south. Nor is the first good impression of Aberdeen spoilt by its appearance, for its immaculate cleanliness and its buildings of the famous Aberdeen silver-gray granite justly entitle it to the name of "The Silver City by the Sea."

Like other old cities, Aberdeen is full of antiquities, some desirable and others undesirable. Among the latter class are the ancient granite tenements or flats in the older part of the city from which many of the inhabitants cannot be tempted any more readily than a New York apartment dweller can be induced to set up a residence in Brooklyn or New Jersey, far from the Great White Way! There seems to be general agreement among the officials interviewed that Scotsmen are much less inclined to seek the isolation of a

cottage than Englishmen. Whether this is so or not, it is clear that quite a number of Aberdonians prefer cramped quarters if they can only be near the

center of the city's activities. A proof of this is afforded by the view at the head of this article, showing "The Shiprow" which is within a couple of minutes' walk from the Municipal Building visible in the background. Since this photograph was taken, one side of the street has been cleared away as a step in the municipality's housing program, but the building on the opposite side still has its full complement of tenants. G. M. Fraser, city librarian, who kindly loaned this view from his collection, said: "The only way you can get some of these people out is to shell them out."

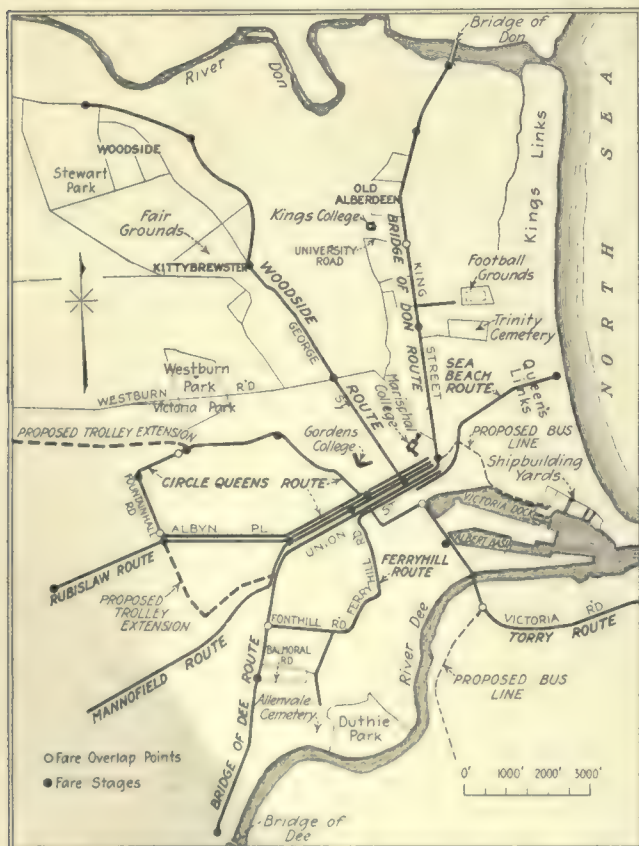
About fifty years ago Aberdeen took the first great step in its modernization when it widened Union Street. This is a magnificent thoroughfare about 1 mile long and easily wide enough for four tracks should they be needed. It is so wide that other vehicles keep off of the car tracks, so that it is the regular thing for motormen to make up time when they reach the principal street downtown—which is surely a novelty! It would have been well for Aberdeen if it had several Union Streets, but most of the old circuitous and narrow lanes downtown have remained to this day to such a degree that only a single track can be laid on some streets and loops are out of the question. Even where there is room, as at Castle Street, the foot of Union Street, a loop is not permitted as this would interfere with the weekly market. Thus at the very center of the city's car service, the cars must be turned back on the four tracks by means of cross-overs. It would seem from this that not privately-owned street railways alone are encumbered by tradition.

The Corporation of Aberdeen began to clear out some of its slums as long ago as 1883 by pulling down the old buildings and then leasing the land for the erection of private business buildings. Later, in accordance with the housing of working class act of 1890, it acquired 2½ acres of vacant ground on which it erected workmen's flats as follows:

Urquhart Road, eight buildings with nine tenants each.....	72
Park Road, four buildings with nine tenants each.....	36
Roslin Street, two buildings with twelve tenants each.....	24
Total tenants.....	132



THE SHIPROW, AN ABERDEEN SLUM STREET AS IT APPEARED BEFORE THE DEMOLITION OF ONE SIDE



MAP OF ABERDEEN, SHOWING PRESENT ROUTES AND PROPOSED CAR AND BUS EXTENSIONS—ALSO FARE STAGES, OVERLAPS, ETC.



As in the case of other British cities, the war has made the problem of future additional housing most acute, for private building is made commercially impossible by the rise in labor and materials. Municipal and State subvention of some kind has therefore become a certainty. In Aberdeen alone it is expected that 1500 buildings of various types will have to be built under governmental auspices during the next five years, merely to meet the shortage of buildings rather than to replace existing structures.

However, the younger sections of the Aberdeen of to-day are as close to American ways as can probably be found anywhere in Great Britain. There are blocks and blocks of one-family and two-family houses very similar in the up-to-dateness of their fittings to American homes. Mingled with these are blocks of six-family houses—the favorite size of flat. Aberdeen has plenty of room for cottages, but many people prefer or have to live in the flats because they get more value for the money. For example, a certain class of apartment can be rented for from \$60 to \$70 per annum. Like accommodation in a cottage would cost \$95 to \$100 per annum. Therefore, it is not astonishing to

of a mile. Such service for a great part of the day, plus the half-penny short-distance rate, induces the man in a hurry to take the first car that will take him anywhere near his destination. In any event, walking along Union Street is reduced to a minimum.

The Bridges, or River Dee to River Don, route is the only through line at present. The others are turned back at Castle Street, owing to the different riding characteristics on opposite sides of the town which, of course, would result in unbalanced travel. An exception to this would be the conversion of the Torry and Woodside lines into a through route. This will probably come under consideration in connection with the widening of Market and St. Nicholas Streets. It is expected that this second through line would have continuously good travel between the paper and woolen mill section at the Woodside end and the shipyards and great fish establishments at the Torry end.

Because of the heavy intermediate short-haul travel, there is little need to economize mileage through turn-backs. At present cars are turned back at only one point, and the chief reason for this is car shortage. In discussing this aspect of operation, William Forbes,



A SCENE ON UNION STREET, ABERDEEN, SHOWING THAT THE BICYCLE IS NO MEAN COMPETITOR OF THE STREET RAILWAY



SCENE AT A CAR STOP, SHOWING SHIELD (WHITE LETTERING ON A RED SHIELD) ON A MUNICIPAL LIGHTING POLE

find flats in the suburban sections to such an extent that certain areas carry restrictions against the building of tenements.

With regard to the whole question of the construction of cottages in the suburbs, it has been observed that it is not the poorer-paid workmen but the higher-paid mechanics or business men who are most desirous to live in them. The laborer may prefer to stay further in town because of his longer working hours and because food is usually a little cheaper in the center of the city than in the suburbs. Therefore, the matter of rate of fare is relatively unimportant. In Aberdeen, this contention is particularly true as will be seen from the fare schedule presented later.

LAYOUT OF THE ROUTES AND SHORT-HEADWAY SERVICE

For its population of 165,000, Aberdeen has approximately 14½ miles of single track, divided among eight routes as shown in Table I.

In addition to the excellent individual headways, four of the routes overlap on Union Street, which means a car every half minute or less for a distance

general manager Aberdeen Corporation Tramways, said that even if the traffic near the ends of the routes was somewhat thinner it was good policy to give through car service in order to discourage walking. The riding habit in Aberdeen, he added, was far from the saturation point. Twenty to thirty cars added to the present peak of eighty-six would prove that.

In accordance with the policy of eliminating the walker; the stops are spaced somewhat closer than is usually the case in Great Britain. The following table shows variations from 390 to 633 ft., and the average for the system as a whole is placed at 471 ft. or slightly more than eleven to the mile. Of course, these

TABLE I—STATISTICS OF THE DIFFERENT ROUTES IN ABERDEEN

Route	Miles	Headways, Minutes	Feet Between Stops	Passengers per Car-Mile
(1) Woodside.....	2.4	2 to 6	495	13.4
(2) Circular.....	3.3	3 to 5	444	14.8
(3) Mannofield.....	2.1	4 to 7	435	14.1
(4) Bridges.....	4.1	5 to 7½	525	14.9
(5) Rubislaw.....	1.9	6 to 10	498	14.0
(6) Ferryhill.....	1.5	7½ to 10	426	14.6
(7) Torry.....	1.7	2½ to 7½	390	17.2
(8) Beach.....	0.9	7½ winter Special in summer	633	19.4

Note—Some of the route mileage is joint mileage.



are only possible, not compulsory, stops. Compulsory stops are those ordered by the inspector of the Board of Trade. They include busy traffic points, but not schools, fire engine stations or the like. About 90 per cent of the stops are made on the near side of intersections, the exceptions being due chiefly to the location of the poles from which the stop signs are carried. Stops are prominently indicated by red signs with white lettering as well as by painting the pole with a striping of red and white. A red shield on similarly-marked poles designates the fare zones.

Several of the waiting rooms at terminals were built jointly for the police and tramways departments. At Dee, the waiting depot includes a refreshment room, the operator of which acts as caretaker. At a number of intermediate stops rustic shelters are provided.

The Aberdeen speed limits for motor cars are 20 m.p.h. and

No. .... Expires on ..... 19

ABERDEEN CORPORATION TRAMWAYS.

COMPOSITION TICKET.

Issued to Mr. ....

Between ..... And .....

From ..... To ..... inclusive.

Entd., £ : : .....

PER GENERAL MANAGER.

COMPOSITION TICKETS are issued subject to the following Regulations:—

1st. They are available for every Car passing between the points above-mentioned, and are subject to all regulations and a limitation of hours that may be made from time to time.

2nd. They are not transferable.

3rd. They must be shown to the Conductor or any other Servants of the Corporation, when required, under the penalty of the regular fare being exacted, and must be delivered up on the way of expiry. If found in the hands of any but one person to whom they were originally issued, they will be forfeited.

4th. The holder is subject to the Corporation's Bye-Laws and Regulations as ordinary Passengers.

5th. If used after the period for which they are issued, the holder will be held liable for a breach of the Corporation's Bye-Laws as travelling with intent to defraud the Corporation.

6th. They are issued conditional on there being room in the Car by which the holder wishes to travel. The holder will be entitled to the use of any extra Cars that may be put on the Route, subsequent to the date of issue, but no deduction from the price can be claimed should the Corporation see fit at any time to reduce the number of Cars running, or should the service be interrupted or discontinued owing to repair or renewal of the tramway lines or snowstorm or any other reason.

COMPOSITION (COMMUTATION) TICKET, WORDING PASTED ON INSIDE OF NUMBERED CLOTH BOOK-LET, GREEN FOR ADULTS AND RED FOR CHILDREN

multiplied by the city's car-mile operating cost, plus 2½ per cent.

The management now has under consideration several additions to the service, of both tramway and omnibus character. The tendency of these extensions is to broaden rather than lengthen the city.

### FARE SYSTEM COMBINES ZONE AND UNIVERSAL PLANS

A most interesting feature of the Aberdeen system of fares is that while a single-stage ride may be obtained for a half-penny, all the stages from the center of the city to a terminus cost only 1 penny. It follows that a person living in the suburban territory is situated just as favorably as under American conditions, while at the same time the railway secures short-haul riding that would not come at the higher fare. Nothing could prove the latter statement better than Aberdeen's experience with the Torry line, which serves a work-

<b>A1 5840</b> <b>CHILDREN (under 12 years of age).</b> Castle Street A Kingsgate B Castle Street A Kingsgate B Ben aed Street C Market Street D Market Street E Donhill Road F 1d Aberdeen Corporation Tramways Available on demand or destroyed on slightest damage. 2d Glasgow Municipal Printing Co. Ltd.	<b>Fb 7040</b> <b>Children A</b> N Fountain 3 Bridge Street 4 Bridge Street 5 St. Peter's Church 1d Aberdeen Corporation Tramways Available on demand or destroyed on slightest damage. 2d Glasgow Municipal Printing Co. Ltd.	<b>Nd 1216</b> <b>Sailors and Soldiers in Uniform.</b> 1 Castle Street A Kingsgate B 2 Castle Street A Kingsgate B 3 Ben aed Street C 4 Market Street D 5 Market Street E 6 Donhill Road F 1d Aberdeen Corporation Tramways Available on demand or destroyed on slightest damage. 2d Glasgow Municipal Printing Co. Ltd.	<b>Xb 6067</b> <b>Children A</b> 1 Castle Street A Kingsgate B 2 Castle Street A Kingsgate B 3 Ben aed Street C 4 Market Street D 5 Market Street E 6 Donhill Road F 1d Aberdeen Corporation Tramways Available on demand or destroyed on slightest damage. 2d Glasgow Municipal Printing Co. Ltd.	<b>Eo 6439</b> <b>CHILDREN'S 1d 2</b> <b>TICKET.</b> Under Twelve Years of Age. Aberdeen Corporation Tramways. Issued subject to By-Laws. To be punched in presence of Passenger, shown or delivered up on demand, or destroyed on slightest damage. Available for ANY DISTANCE on any ONE CAR. Glasgow Municipal Printing Co. Ltd.	<b>Eb 8966</b> <b>KING'S GATE</b> 1d Castle Street 2d Market Street 3d Market Street 1d Aberdeen Corporation Tramways Available on demand or destroyed on slightest damage. 2d Glasgow Municipal Printing Co. Ltd.	<b>Iv 3497</b> <b>King's Gate</b> 1d Castle Street 2d Market Street 3d Market Street 1d Aberdeen Corporation Tramways Available on demand or destroyed on slightest damage. 2d Glasgow Municipal Printing Co. Ltd.	<b>Dr 3836</b> <b>Bridge of Don</b> 1d Castle Street 2d Market Street 3d Market Street 1d Aberdeen Corporation Tramways Available on demand or destroyed on slightest damage. 2d Glasgow Municipal Printing Co. Ltd.
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SPECIMENS OF ABERDEEN FARE RECEIPTS

for street cars 14 m.p.h. The schedule speed of the cars for the entire system is 7.6 m.p.h. There are no traffic rules to prevent automobile parking, but offending vehicles can be removed at the discretion of the policeman. The traffic policemen always give preference to street car traffic where blockades are concerned.

Although some of the streets downtown are so narrow as to permit only one track, there is no one-way operation of either cars or general vehicles. No block signals are used for cars running over these single-track sections. The motormen depend upon their time-points and upon seeing the upper-deck headlight which shows the color used to identify a given line. This scheme has worked satisfactorily to date despite the fact that cars in each direction have to be operated at intervals of two minutes. The longest single-track section of this kind is 850 ft.

The 14½ miles of track (measured as single track) previously mentioned is all that the city has. However, some additional service is due to the fact that the Aberdeen Suburban Tramways, a privately-owned company, runs over the municipality's tracks. The Suburban cars while within the city limits handle all local business as a city car. For this service the city pays the Suburban Tramways a sum equal to the mileage

ing-class district. When the only fare on this line was 1 penny, it earned just 9d. (18 cents) per car-mile and was the lowest of all. Five years ago the 1d. fare was instituted whereupon the traffic more than doubled, and the earnings rose to 17.2d. (34.4 cents) per car-mile. Instead of a seven and one-half minute service, cars are run every two and one-half minutes the greater part of the day! On some days the limitations imposed by a single track on part of the route actually make it impossible to handle all of the service offered.

In addition to the 1d. short-ride minimum fare for the adult rider, the Tramways have two other tickets of this denomination, as follows: Children's tickets, for ages from two to twelve years inclusive, good for the usual penny distance; sailors' and soldiers' tickets (since Aug. 20, 1917). The penny tickets, as already noted, are good for a full ride from the center of the city to the terminus of the line. If, however, a passenger on the Bridge of Dee-Bridge of Don through line wishes to ride from terminal to terminal, his fare would reach the maximum of 2d. In other words, the penny full-route fare does not apply to maximum cross-town rides. Furthermore, a passenger on the Circle Queen's line would not be permitted to loop around for a single penny fare, as the terminus of this route, from the fare standpoint, is at its mid point, as in-



licated. A sightseer, therefore, who wanted to go all the way around would have to pay 2d. There is another condition where the fare could exceed the normal penny charge, namely, in the case of turnbacks. Thus, on the Woodside route it is customary to turn back some cars at Kittybrewster. If through passengers boarded the Kittybrewster car they would expect a free transfer to the following through car. To avoid this possibility, the tickets are punched to Kittybrewster and it is ordered that only the through cars shall carry such riders to the terminus for a penny. If a passenger boards a following car at Kittybrewster he must purchase a new ticket.

KINDS OF FARES AND ROUTE EARNINGS

As it is not desirable to discourage short-haul cross-town riders, a few overlaps have been established. One of these allows a penny ride from King's College (University Road) to Ferryhill (Fonthill Road), as indicated by the parallel lines on the map. The other overlaps, similarly indicated, are of minor importance. Overlaps are used as little as possible since they tend to confuse

tended for the lost time on production of a doctor's certificate! The composition ticket is especially popular on the Mannofield line where about one-fifth of the riders are commuters. Roughly, the full adult rate is 12s. 6d. (\$3.00) for the first 2100 ft. and 6d. (12 cents) for every additional 300 ft.

The several classes of tickets referred to are shown in the accompanying group. The children's ticket of the 6400 series is the one used for the straightaway ride from the center of the city to a terminus while that of the 5800 series is used in case of overlaps. It will further be noted that the 1d. and 2d. tickets do not show as many stages as the 3d. ticket. The tramways also sell celluloid tokens at full price in lots of 1s. upward to the postoffice and other employers of messengers.

In view of the extremely moderate fares, it is interesting to observe the high car-mile earnings. Thus, the report for the year ending May 31, 1918, shows the results given in Table II.

Even these excellent figures will be exceeded during the present fiscal year, Mr. Forbes' estimate being 45,-



AN EXAMPLE OF ABERDEEN'S CUSTOMARY FLAT—THE SIX-FAMILY HOUSE



ABERDEEN HAS THOUSANDS OF THESE COMFORTABLE ONE-FAMILY HOUSES

the conductor, and with a half-penny base fare there is little need for their establishment.

Before passing on to the statistics showing the classifications of passengers according to fares paid, note should be made of what is locally termed a "composition" ticket. This is a non-transferable commutation ticket of such long-established popularity that the public would strenuously protest if it were withdrawn. Such tickets, good for periods of three months, are sold for as low as 13s. (\$3.12 up to 21s. 9d. (\$5.22)). Children's tickets are sold at half price. Should the holder of a ticket be unable to use it because of illness during the entire quarter, he can have the ticket ex-

000,000 passengers and a revenue of £140,000. The figures given in Table III cover the thirty-three weeks from June 1, 1918, to Jan. 23, 1919.

The high earnings per car-mile of the Beach line are to be attributed to the fact that the adult fare on this pleasure route is 1d. for any distance whereas the line is only 0.9 mile long. It is rightly held that people on pleasure bent should not begrudge paying a slightly higher fare on a line that has heavy travel only two or three months in the year. Individual half-penny stages are shown in Table II. The average half-penny stage for the entire system is about 0.6 mile, the average penny stage or center to terminus ride, 1.9 miles, while the single 2d. ride is 3.7 miles.

TABLE II—PASSENGERS AND RECEIPTS PER CAR-MILE FOR YEAR ENDED MAY 31, 1918

Route	Passengers	Average 1/2 d. Stage, Ft.	Passengers per Car-Mile	Receipts per Car-Mile in Cents
Woodside.....	6,955,248	3,192	13.4	25.7
Circular.....	6,192,348	3,105	14.8	25.5
Mannofield.....	4,617,138	3,390	14.1	25.6
Bridges (Dee to Don Rivers).....	6,381,839	3,495	14.9	25.4
Rubislaw.....	2,259,088	2,919	14.0	24.5
Ferryhill.....	1,604,496	3,264	14.6	23.4
Torry.....	3,724,532	3,000	17.2	24.0
Beach.....	1,004,839		19.4	34.9
Total.....	32,739,528	Average	15.06	Average 25.4

\* Exclusive of commutation or composition tickets.

TABLE III—PASSENGERS AND RECEIPTS PER CAR-MILE FOR THIRTY-THREE WEEKS ENDED JAN. 22, 1919

Route	Number of Passengers Carried	Passengers per Car-Mile	Receipts per Car-Mile (in Cents)
Woodside.....	5,593,408	18.3	29.4
Circular.....	5,079,386	18.5	29.6
Mannofield.....	3,811,306	14.5	24.8
Bridges.....	5,217,311	18.7	30.0
Rubislaw.....	1,776,369	17.2	27.6
Ferryhill.....	1,321,294	18.5	28.6
Torry.....	3,267,154	20.8	28.2
Beach.....	922,123	24.8	42.6
Total.....	27,088,351	Average 18.2	Average 30.1



DAY <i>Saturday</i>										DATE <i>4<sup>th</sup> January 1919</i>																	
ROUTE	CONDUCTOR	Box No.	Car No.	Children's Tickets			Soldiers and Sailors			1d.			1d.			1d.			1d.			1d.			2d.		
				Com No.	Class No.	Sold	Com No.	Class No.	Sold	Com No.	Class No.	Sold	Com No.	Class No.	Sold	Com No.	Class No.	Sold	Com No.	Class No.	Sold	Com No.	Class No.	Sold	Com No.	Class No.	Sold
CIRCULAR	<i>C. Kingman</i>	<i>31</i>		<i>427</i>	<i>1st</i>	<i>171</i>	<i>7694</i>	<i>1st</i>	<i>57</i>	<i>4113</i>	<i>4th</i>	<i>135</i>	<i>275</i>	<i>1st</i>	<i>91</i>			<i>426</i>	<i>1st</i>	<i>267</i>	<i>2023</i>	<i>1st</i>	<i>120</i>	<i>575</i>	<i>241</i>	<i>173</i>	<i>52</i>
	<i>J. Mac</i>	<i>2</i>	<i>35</i>	<i>231</i>	<i>2nd</i>	<i>159</i>	<i>4110</i>	<i>2nd</i>	<i>71</i>	<i>3774</i>	<i>2nd</i>	<i>114</i>	<i>445</i>	<i>2nd</i>	<i>129</i>			<i>2011</i>	<i>2nd</i>	<i>46</i>	<i>7574</i>	<i>2nd</i>	<i>765</i>	<i>4160</i>	<i>2nd</i>	<i>106</i>	<i>1450</i>
	<i>J. McPherson</i>	<i>3</i>	<i>23</i>	<i>2570</i>	<i>4th</i>	<i>100</i>	<i>210</i>	<i>4th</i>	<i>156</i>	<i>4113</i>	<i>4th</i>	<i>120</i>	<i>442</i>	<i>4th</i>	<i>71</i>			<i>2670</i>	<i>4th</i>	<i>227</i>	<i>4470</i>	<i>4th</i>	<i>203</i>	<i>66</i>	<i>51</i>	<i>262</i>	<i>2138</i>
TOTALS FOR THE DAY.				<i>3621</i>			<i>1766</i>			<i>2899</i>			<i>2203</i>			<i>7638</i>			<i>9874</i>			<i>1929</i>			<i>7</i>		
TOTALS FOR PREVIOUS DAYS.				<i>501700</i>			<i>186724</i>			<i>494938</i>			<i>577114</i>			<i>629123</i>			<i>1624449</i>			<i>306558</i>			<i>4693</i>		
TOTALS TO DATE.				<i>505321</i>			<i>188490</i>			<i>497837</i>			<i>580227</i>			<i>632521</i>			<i>1634323</i>			<i>308507</i>			<i>4700</i>		

CONDUCTOR'S WAYBILL FOR DAY COMPLETE WITH RECORD OF ALL CLASSES OF TICKETS, TOT

For the fiscal year ending May 31, 1918, the traffic according to classification of tickets, except composition, was as given in Table IV.

TABLE IV—NUMBER AND CLASSIFICATION OF TICKETS SOLD, YEAR ENDED MAY 31, 1918


Description	Number Sold	Percentage	Value, Per Cent
Children's tickets.....	3,365,932	11.17	6.99
Soldiers' and sailors.....	1,456,205	4.41	2.95
1d. ordinary.....	8,227,061	25.16	15.69
1d. ordinary.....	19,337,295	59.12	73.97
2d. ordinary.....	53,935	0.14	0.40
Total.....	32,739,528	100.00	100.00

A striking feature is the large number of children's tickets sold. An Aberdonian youngster would rather spend his half-penny for a ride than anything else. With no change in fares, the total travel increased from 27,141,275 for the fiscal year ending May 31, 1917, to 32,739,528 for the fiscal year ending May 31, 1918. This raised the number of rides per inhabitant per

annum to 229. The income increased from £100,073 to £116,397; operating expenses increased from £36,047 to £39,400, while fixed charges, depreciation, renewals, etc., decreased from £27,283 to £27,188. So far, Aberdeen's careful management and intensive cultivation of the riding habit have made it unnecessary to increase fares. However, the increase in labor charges has been particularly heavy, and no one can predict what will happen if the upward trend continues. With reasonably good fortune, on the other hand, Aberdeen will be able to write off the rest of its investment charges within three or four years.

## FARE COLLECTION AND AUDITING

It is an interesting fact that for several years prior to 1916, the Aberdeen Corporation Tramways used the prepayment system of fare collection. From an operating standpoint prepayment was satisfactory, but some of the passengers continued to agitate for the old way

**ABERDEEN**  
 Corporation  Tramways.  
**TABLE OF FARES**

ROUTE	BETWEEN STAGES	CHARGE
UNION STREET	Castle Street and Queen's Street	Bridge Street and Holburn Junction
WOODSIDE	St. Nicholas Street and Holburn Street	Clifton Road and Fountain, Fountain and Terrace
RUBISLAW	Holburn Junction and Queen's Cross	Queen's Cross and Terrace
CIRCULAR	Holburn Junction and Queen's Cross	Queen's Cross and Terrace
MANNOFIELD	Holburn Junction and Queen's Cross	Queen's Cross and Terrace
BRIDGES	Castle Street and King's Gate	Holburn Junction and Holburn Road
FERRYHILL	Bridge Street and Holburn Street	Milburn Street and Deane Park
TORRY	Bridge Street and Holburn Street	Milburn Street and Deane Park
BEACH	Market Street and Bathing Station	
TORRY	Union Street and St. Fittick's Road	
WOODSIDE	St. Nicholas Street and Woodside	
RUBISLAW	Castle Street and Rubislaw	
CIRCULAR	Castle Street and King's Gate (via Rosemount)	
MANNOFIELD	Castle Street and King's Gate (via Albyn Place)	
BRIDGES	Bridge of Don and Market Street	
FERRYHILL	Castle Street and Holburn Road	
BRIDGES	Bridge of Don and Market Street	
CIRCULAR	Castle Street (Circle either way) to Castle Street	

Children under 2 years of age, free. Children over 2 years and under 12 years, 1d. for any penny distance.

At package (with the exception of articles) sent for any distance on any one Car . . . . . 2d

Personal Luggage over 20 lbs. in weight for any distance on any one Car . . . . . 2d

**PARCELS DELIVERY SERVICE.**  
 Hand your Parcels to any Conductor to be Delivered.  
**CHARGE 2d. ANY DISTANCE.**  
 PARCELS up to 14 lbs. in weight will be received by Conductors for delivery by Tramway Messengers to any distance within Half-mile of the Corporation Tramway Track for the charge of 2d.

**NUMBER 45**

*1 white*

Date into Bin.	Com.	Class.	Issued.	Date into Bin.	Date into Bin.	Com.	Class.	Issued.	Date into Bin.
<i>1919. Pr</i>			<i>19</i>						
<i>any 0000 0999 1000 any</i>									
<i>1000 1999 1000</i>									
<i>2000 2999 1000</i>									
<i>3000 3999 1000</i>									
<i>4000 4999 1000</i>									

## INDIVIDUAL TICKET BOX RECORD OF TICKETS HELD FOR A GIVEN CONDUCTOR

**ABERDEEN CORPORATION TRAMWAYS.**

**REQUISITION FOR TICKETS.**

ROUTE	DATE	Box No.	Description	Series Letter	Next No. Wanted	Quantity
<i>Woodside</i>	<i>8 Jan 1919</i>					
		<i>15</i>	<i>2 blue ones</i>	<i>24</i>	<i>0000</i>	<i>500</i>
			<i>1 white</i>	<i>67</i>	<i>0000</i>	<i>1000</i>

ISSUED BY \_\_\_\_\_ CONDUCTOR \_\_\_\_\_

ENTERED BY \_\_\_\_\_



INUES, NUMBER OF PASSENGERS. NOTATION CONCERNING TICKETS WORKED OUT OF ORDER, ETC.

To check the proper collection of fares and to see that each passenger has the correct receipt and is not over-riding, the Tramways employ four ticket inspectors in shifts of two each as compared with 130 conductresses and nine conductors. The inspectors' shifts are so arranged that all are on duty during the rush

When the conductress receives her tickets at the start of the day's work she also receives her waybill (trip sheet) on which she enters the opening numbers of each kind of ticket supplied. On this waybill she writes in her trip-by-trip terminal times as taken from

A black and white portrait of a man with a mustache, wearing a dark suit, white shirt, and dark tie. He is looking slightly to the left of the camera. The portrait is set within a decorative, dark, textured border.







sary, relief conductresses are provided and fifteen to thirty minutes' time is allowed for making a final report at the end of the day.

#### IMPROVED ROLLING STOCK

The standard Aberdeen car is of the double-deck type with windshields instead of vestibules. It is 30 ft. long over all including two 6-foot platforms open on the boarding side and with an emergency exit gate (used in prepayment days) on the inner side. The trucks are Brill 21-E with two Westinghouse 25-hp. motors on the earlier cars and GE-200-K 35-hp. motors on the later cars. Hand brakes of the ordinary type are used on most of the cars, but sixteen of more recent construction have been fitted with Peacock brakes which are more popular with the men. The Westinghouse magnetic brake is used only on grades or in other emergency conditions.

Although the seats in the upper deck are of slat, home-made manufacture, those on the lower deck are considerably in advance of the wooden longitudinal seats

hood or canopy on the upper deck to shelter outside passengers against wind and rain. This has proved very popular. The total weight of these cars is 22,400 lb. or 415 lb. per seated passenger.

Satisfied that it could improve upon the type described, the management has recently completed the first of three cars in which upholstered cross seats are used on the lower deck. As shown in an accompanying illustration, double and single seats have been installed owing to the restriction that the space between tracks must be wide enough to permit a person to stand between passing cars without injury. This type of car

Tuesday, Jan. 7, 1919.  
From Inspector F. Murdoch.

To the General Manager.

Sir—I beg to report:

Car 77. Checking said car at Loch Street on the journey to town I found one missed penny fare in the saloon from Clifton Road. I informed the conductress and saw she collected same.  
Conductor V. McGregor.  
10:46 a.m.  
Woodside.  
Car 33. Checking this car at Bridge Street while proceeding to Castle Street I found one missed fare in the saloon from Mount Street. I informed the conductress and saw she collected halfpenny.  
Conductor Jenny Davidson.  
11:19 a.m.  
Queen's X.  
Car 87. I checked this car at Bridge Street while proceeding to Castle Street and found one missed fare in the saloon from Mount Street. I informed Miss MacDonald and she then collected halfpenny.  
Conductor Daisy MacDonald.  
11:42 a.m.  
Kings Gate.  
Car 5. Checking this car at Holburn Road while proceeding to Bridge of Dee I found two missed penny fares in the saloon from Bridge Street. I informed Miss Haig and saw she collected same.  
Conductor H. Haig.  
8:23 p.m.  
Bridges.

#### PART OF ABERDEEN TICKET INSPECTOR'S REPORT

found on most British cars. They are comfortably upholstered in a composition leather, while American-made "Rico" sanitary straps are available for the standees. Another feature is the use of patented roof ventilators, known as the "Eros Air Extractors," in place of the customary monitor side-sash ventilation. Illumination is afforded by four six-lamp circuits of Siemens 16-cp. special filament lamps. One each of these lamps is over the conductor's position, another is used to illuminate a white bullseye in the front bulkhead, a fourth for the red bull's-eye tail light required in the rear bulkhead according to Board of Trade regulations, two more for the destination sign and another for the colored box light carried from the upper bulkhead in place of a dasher headlight.

Passengers enter the carbody either through the 21-in. center bulkhead door on the lower deck or the 22-in. door on the upper deck. At busy loading points the front entrance is also used. They are not permitted to leave via the front way except at terminals. For their convenience, as well as that of the conductress, push-button dry-battery bell signals are installed in the bulkheads and the window posts. Platform accidents are minimized by the use of motorman's mirrors, one at the side and one directly in front.

A recent improvement has been the addition of a

Aberdeen Corporation Tramways.	
CASH CLERKS' WEEKLY REPORT—(MONDAY)	
To the General Manager.	
Are all the Conductors' Purses in good working order?	
Have all the Conductors' shortages been collected?	
Has the Weekly Ticket Balance come out right?	
Mention any errors discovered in Journals, Ticket Book, &c.—	
Mention Conductors with Tickets repeatedly out of order—	
Have you had any complaints from Conductors about their work or your work?	
Have you all the stock of Tickets and Stationery you require?—	
Have you had to work any overtime, and for what reason?	
Is there anything which you can suggest for the better working of your Department?	
Date,	Signature,

#### CASH CLERK'S WEEKLY REPORT TO THE GENERAL MANAGER

has two seats less on the lower deck but gives two seats more on the upper deck. The one in use has already demonstrated its popularity.

#### EMPLOYEES

Like all other British tramways, Aberdeen has been obliged to employ a very large proportion of women. Thus the roster for January 1919 shows 130 conductresses against nine conductors. The eight cash clerks are women and there is also a woman ticket inspector. As the Corporation is obligated to return men to their positions as they return, the few motorwomen employed recently have already been replaced although they had proved thoroughly competent. The chief difference in efficiency is due to the fact that the women are absent more frequently. They are inclined to average about one day off every week whereas the men, in accordance with the layout of work, get one Sunday off every three weeks and serve six hours on



TABLE V—SHOWING STAFF OF ABERDEEN CORPORATION  
TRAMWAYS

	Male	Female	Total
Managerial and administrative.....	2	1	3
Chief clerk.....	1	1	2
Chief cash clerk.....	1	1	2
Cash clerks.....	1	7	8
General office, clerks, traffic clerks, timekeeper, storekeeper, typists, etc.....	5	7	23
Inspectors:			
Chief inspector.....	1	1	2
Ticket inspectors.....	4	1	5
Traffic regulators.....	2	1	3
Motorman inspector.....	1	1	2
Motormen.....	105	1	106
Conductors.....	9	130	139
Cleaners.....	28	1	29
Repair staff.....	52	1	53
Miscellaneous, including parcels messengers.....	16	1	17
Total.....	226	146	372

all other Sundays, an average of four and one-half hours for the three weeks. In general, a fifty-four and one-half-hour, seven-day week is in effect, the four and one-half hours on Sunday counting as overtime at 50 per cent additional pay. Fifteen minutes a day is paid for as signing-on or reporting time.

One week, platform employees are assigned two-swing runs, beginning at 7 a.m. and finishing at 6 p.m. with a break between 10 a.m. and 1 p.m. The following week, the same employees start at 10 a.m. and finish at 11.30 p.m. with a break between 1 p.m. and 6 p.m. Before the war the tramway service was given from 5 a.m. to midnight. Up to the present time, the last cars are leaving the center of the city at 11 p.m. Under these circumstances, it is not difficult to arrange the schedule on the basis of two crews to one car.

It may be mentioned here that the public is fully apprised of these "first and last car" schedules through the use of schedule boards which are posted at all terminals and at many places throughout the city.

STANDARD ABERDEEN CAR—NOTE THE CHARACTERISTIC  
TWO-FAMILY GRANITE SUBURBAN HOUSES  
IN THE BACKGROUND

Headways are so short now that it is no longer necessary to put timetables in the cars.

Wages reach their maximum after four years' service in the case of motormen and three years in the case of conductors and conductresses. The first-year wages of motormen have gone up from £1 3s. 2d. (\$5.56) to £2 17s. 8d. (\$13.84) and those of fourth-year motormen have advanced from £1 13s. 2d. (\$7.96) to £3 7s. 2d. (\$16.12). Conductors' first-year wages are the same as motormen, but do not go beyond the latter's third-year

rate, which is now advanced from £1 10s. 9d. (\$7.38) to £3 4s. 9½d. (\$15.55). The wages of women conductors range from £2 3s. 6½d. (\$10.45) for the first year to £2 10s. 8d. (\$12.01) for the third year. It is plain from these figures that the increase in wages is as serious a factor in Great Britain as in the United States. In these calculations a shilling is taken as the equivalent of 24 cents.

Although the Aberdeen property with its eighty-six cars and 250 transportation employees is not a big sys-

INTERIOR OF LOWER DECK OF ABERDEEN CAR, SHOW-  
ING ARRANGEMENT OF CROSS-SEATS IN STAGGERED  
RELATION BECAUSE OF DEVIL-STRIP RESTRICTIONS

tem, the highest standards of operation are followed. Traffic is carefully checked every day as shown in the traffic inspectors' reports, ampere-hour meters are on all cars to check the use of energy, Bundy recorders are installed on all the routes for the time-checking of the platform employees, instruction bulletins on the avoidance of accidents reinforce the regular efforts of the motorman instructor, etc. In short, the same spirit of progress shown in building up the income account is manifested in handling the operating details.

### Diesel Engine Defined

THE Diesel Engine Users' Association of Great Britain has formulated some definitions which are now before the members, preliminary to adoption, and which will serve to clarify phraseology in this field. A Diesel engine is defined as a prime mover actuated by the gases resulting from the combustion of a liquid or pulverized fuel injected in a fine state of subdivision into the engine cylinder at or about the conclusion of a compression stroke. The heat generated by the compression to a high temperature of air within the cylinder is the sole means of igniting the charge. The combustion of the charge proceeds at, or approximately at, constant pressure. A semi-Diesel engine is a prime mover actuated by the gases resulting from the combustion of a hydrocarbon oil. A charge of oil is injected in the form of a spray into a combustion space open to the cylinder of the engine at or about the time of maximum compression in the cylinder. The heat derived from an uncooled portion of the combustion chamber, together with the heat generated by the compression of air to a moderate temperature, ignites the charge. The combustion of the charge takes place at, or approximately at, constant volume.



# Eleven Billion Fare Passengers in 1917

## Preliminary Statistics of Bureau of Census Show Accumulating Burdens of Electric Railways—100 Rides a Year to Every Person in United States

THE street and interurban railways of the United States during the calendar year 1917 transported more than eleven billion fare-paying passengers, representing an average of more than 100 trips for each man, woman and child in the United States. The electric railways in that year operated 102,603 cars on 32,535 miles of line, comprising 44,812 miles of track. They employed 294,826 persons, to whom were paid salaries and wages aggregating \$257,240,362. They received revenues amounting to \$650,149,806 from railway operations. The rates of increase in the various items presented by the report were in most cases materially less during the period 1912-17 than during the preceding five years.

The details of this showing are given in Tables I and II from a preliminary report by S. L. Rogers, director of the Bureau of the Census, Department of Commerce. This report, which was prepared under the supervision of Eugene F. Hartley, chief statistician for manufactures, relates to the calendar years 1917, 1912 and 1907. The statistics cover electric-light plants operated in connection with electric railways and not separable therefrom, but do not cover mixed steam and electric railways or railroads under construction.

The report for 1917 in Table I gives figures for 947 operating and 364 lessor companies. The number of operating companies compares with 975 in 1912 and 945 in 1907. The line mileage represents an increase of 6.9 per cent over 1912 and 27.4 per cent over 1907, and the corresponding rates of increase in track mileage were 9.1 and 30.3 respectively. The total number of cars reported—comprising 79,914 passenger cars and 22,689 freight and other non-passenger cars—shows increases of 9.1 per cent for the period 1912-1917 and of 22.7 per cent for the decade 1907-1917. The electric locomotives in use numbered 357 as compared to 277 in 1912 and 117 in 1907. During the later five-year period an increase of 4.4 per cent in the total number of employees was accompanied by an increase of 28 per cent in salaries and wages; and during the ten-year period 1907-17 the corresponding rates of increase were 33.1 per cent and 70.4 per cent.

The total primary horsepower amounted to 4,200,192 hp. in

1917, an increase of 14.7 per cent over 1912 and of 66.7 per cent over 1907. The great bulk of this power was derived from steam, which contributed 3,543,915 hp. to the total as compared to 627,983 hp. obtained from water and 28,294 hp. from internal-combustion engines. The rate of increase in steam power, however, was considerably less than the rates for the other forms of power.

A pronounced tendency to use larger units appears in the case of all three classes of power. Between 1907 and 1917 the average horsepower of the steam engines increased from 716 to 2036; of the water wheels, from 403 to 1987, and of the internal-combustion engines, from 398 to 534.

In addition to 11,304,660,462 revenue passengers, the electric railways carried 3,021,137,935 transfer and 181,116,176 free passengers, making a total of 14,506,914,573. This total represents an increase of 19.5 per cent during the period 1912-1917 and 52.2 per cent for the

TABLE I—COMPARATIVE CENSUS FIGURES OF ELECTRIC RAILWAYS IN UNITED STATES FOR DECADE 1907-1917

	1917	1912	1907	Per Cent of Increase 1907-1917 1912-1917 1907-1912		
Number of companies.....	1,311	1,260	1,236	.....	.....	.....
Operating.....	947	975	945	0.2	a2.9	3.2
Lessor b.....	364	285	291	.....	.....	.....
Miles of line.....	32,534.68	30,437.86	25,547.19	27.4	6.9	19.1
Miles of single track c.....	44,811.53	41,064.82	34,381.51	30.3	9.1	19.4
Cars.....	102,603	94,016	83,641	22.7	9.1	12.4
Passenger.....	79,914	76,162	70,016	14.1	4.9	8.8
All other.....	22,689	17,854	13,625	66.5	27.1	31.0
Electric locomotives.....	357	277	117	205.1	28.9	136.8
Number of persons employed.....	294,826	282,461	d 221,429	33.1	4.4	27.6
Salaries and wages.....	\$257,240,362	\$200,890,939	\$150,991,099	70.4	28.0	33.0
Total horsepower.....	4,200,192	3,661,385	2,519,823	66.7	14.7	45.3
Steam engines:						
Number.....	1,741	2,258	3,368	a48.3	a22.9	a33.0
Horsepower.....	3,543,915	3,165,888	2,411,527	47.0	11.9	31.3
Internal-combustion engines:						
Number.....	53	48	41	73.2	17.0	48.1
Horsepower.....	28,294	24,190	16,335	73.2	17.0	48.1
Water wheels:						
Number.....	316	383	228	38.6	17.5	68.0
Horsepower.....	627,983	471,307	91,961	582.9	33.2	412.5
Kilowatt capacity of dynamos.....	2,928,454	2,505,316	1,723,416	69.9	16.9	45.4
Output of stations, kilowatt-hours.....	7,240,502,789	6,002,659,036	4,759,130,100	52.1	20.6	26.1
Energy purchased, kilowatt-hours.....	4,947,348,042	3,017,368,753	e.....	.....	64.0	.....
Passengers carried.....	14,506,914,573	12,135,341,716	9,533,080,766	52.2	19.5	27.3
Revenue.....	11,304,660,462	9,545,554,667	7,441,114,508	51.8	18.4	28.3
Transfer.....	3,021,137,935	2,423,918,024	1,995,658,101	51.4	24.6	21.5
Free.....	181,116,176	165,869,025	96,308,157	88.1	9.3	72.2
Revenue car mileage.....	2,139,222,930	1,921,620,074	1,617,731,500	32.2	11.3	18.8
Income account (operating companies):						
Railway operations—revenues.....	\$650,149,806	\$535,996,122	d\$400,896,034	62.2	21.3	33.7
Auxiliary operations—revenues.....	59,675,286	31,515,582	17,291,824	245.1	89.4	82.3
Non-operating income.....	20,282,948	18,418,813	11,556,396	75.5	10.1	59.4
Income from all sources.....	\$730,108,040	\$585,930,517	\$429,744,254	69.9	24.6	36.3
Operating expenses.....	\$452,594,654	\$332,896,356	\$251,309,252	80.1	36.0	32.5
Deductions from income (including taxes).....	221,062,456	184,894,272	f138,094,716	60.1	19.6	33.9
Net income.....	\$56,450,930	\$68,139,889	\$40,340,286	39.9	a17.2	68.9
Dividends g.....	48,337,435	51,650,117	26,454,732	82.7	a6.4	95.2
Surplus.....	\$8,113,495	\$16,489,772	\$13,885,554	a41.6	a50.8	18.8

(a) Denotes decrease.

(b) Lessor companies, 1917, include companies maintaining separate organization though leased to and controlled through stock ownership by other companies, largely in Pennsylvania. In 1912 and 1907 these were treated as merged and not included in the number reported.

(c) Includes track lying outside the United States (1917, 29.95 miles; 1912, 31.91 miles; and 1907, 27.52 miles), but excludes track not operated.

(d) For 939 companies.

(e) Figures not available.

(f) Inclusive of charges for sinking funds, carried as profit and loss accounts.

(g) Dividends were paid by 300 operating companies in 1917 and by 292 in 1912.



decade 1907-1917. The revenue car mileage totaled 2,139,222,920, an increase of 11.3 per cent over 1912 and of 32.2 per cent over 1907.

The electric power consumed in 1917 aggregated 12,187,850,831 kw.-hr., of which 7,240,502,789 kw.-hr. were generated by the companies themselves and 4,947,348,042 kw.-hr. were purchased. The rate of increase in total power consumed during the five-year period 1912-

from that used in 1912. These differences were caused by changes in the I. C. C. system of accounts.

For example, the \$535,996,122 of revenues from railway operations and the \$31,515,582 of revenues from auxiliary operations as now reported for 1912 can be checked against the differently combined figures given in the 1912 census report, but no exact information is at hand to show how the \$322,896,356 of operating expenses for 1912 should be divided between railway operations and auxiliary operations. This amount of \$332,896,356 includes "operating expenses of light and power departments" to the amount of \$14,195,822, but it is not clear that this latter sum represents all expenses chargeable against light and power operations. Hence strictly comparable figures are not deducible.

Furthermore, in 1917 the revenues and expenses of auxiliary operations other than those of the light and power department are included under "auxiliary operations." These revenues amount to \$5,326,411 and are included in the \$59,675,286. Such was not the case in 1912 and 1907. The auxiliary operations—revenues of 1912 and 1907 (\$31,515,582 and \$17,291,824 respectively) pertain to "light and power departments only."

With respect to taxes, too, the schedules differ. In 1912 and 1907 the taxes were a deduction from income and were reported as a whole for all operations, amounting to \$35,027,965 in 1912 and to \$19,765,602 in 1907. In the 1917 schedule, however, "taxes assignable to operations" were reported. Taxes assessed on "miscellaneous physical property" do not enter into this account. The differences, perhaps, are not very important, and in general it may be said that the figure given for 1917, namely, \$45,756,695, is fairly comparable with the foregoing figures for 1912 and 1907.

The 1912 census report gives a net income of \$61,910,753 after the payment of \$191,123,408 for deductions from income, including taxes, interest, rentals and miscellaneous. It will be noticed that the 1912 figure for deductions from income, as given in Table I, is \$184,894,272. This difference of \$6,229,136 is due to "charges for sinking fund," which according to the present I. C. C. system of accounts is a "disposition of net income" account, whereas in 1912 it was under "deductions from gross income."

The foregoing explains the increase in net income to \$68,139,889 for 1912 as reported in Table I and Table II, for the changes in "deductions from gross income" and in "net income" are counterbalancing. It also explains the change in surplus from the \$10,260,636 reported in the 1912 census to the \$16,489,772 in Tables I and II.

Lastly, in regard to the profit and loss accounts shown in Table II, changes in the schedules make it impossible to give comparable figures except with respect to "charges for sinking fund and other reserves." But the 1912 schedule called for "charges for sinking fund, if any," while the 1917 item included "other reserves." Possibly all items of the latter character were not included under "charges for sinking fund" in 1912. Otherwise, the amount in 1912 comparable with the \$9,927,578 of 1917 is the item of \$6,229,136 before noted. Comparative figures for "sundry appropriations of net income" and "profit and loss credits" are not available for 1912. The following comparison can be made:

TABLE II—INCOME STATEMENT OF ELECTRIC RAILWAYS IN UNITED STATES FOR THE CALENDAR YEARS 1917 AND 1912

	1917	1912
Railway operations—revenues.....	\$650,149,806	\$535,996,122
Railway operations—expenses.....	421,250,838	*
Net revenue, railway operations.....	\$228,898,968	*
Auxiliary operations—revenues.....	\$59,675,286	\$31,515,582
Auxiliary operations—expenses.....	31,343,816	*
Net revenues, auxiliary operations.....	\$28,331,470	*
Net operating revenue.....	\$257,230,438	\$234,615,348
Taxes assignable to operations.....	45,756,695	*
Operating income.....	\$211,473,743	*
Non-operating income.....	20,282,948	18,418,813
Gross income.....	\$231,756,691	*
Deductions from gross income.....	175,305,761	*
Net income.....	\$56,450,930	\$68,139,889
Dividends.....	48,337,435	51,650,117
Surplus.....	\$8,113,495	\$16,489,772
Profit and loss accounts:		
Charges for sinking fund and other reserves.....	\$9,927,578	\$6,229,136
Sundry appropriations of net income.....	8,257,632	*
	\$18,185,210	*
Profit and loss credits.....	1,205,910	*
Net total.....	\$16,979,300	*
Deficit.....	\$8,865,805	*

\*Exact comparative figure not available; see text.

1917, which amounted to 35.1 per cent, was much greater than the rates of increase during the same period in revenue car mileage and passengers carried—11.3 per cent and 19.5 per cent respectively. This difference was due mainly to the rapid increase in the light and power business done by the railway companies.

The income of the companies from all sources in 1917 aggregated \$730,108,040, of which sum \$650,149,806 represented revenues from railway operations, \$59,675,286 was derived from auxiliary light and power business and \$20,282,948 was non-operating income. The revenues from railway operations increased by 21.3 per cent during the period 1912-1917 and by 62.2 per cent between 1907 and 1917, but those from light and power business increased by 89.4 per cent and 245.1 per cent during the five-year and ten-year periods respectively.

The operating expenses aggregated \$452,594,654, an increase of 36 per cent over 1912 and 80.1 per cent over 1907. The deductions from income, comprising taxes, interest and other fixed charges, amounted to \$221,062,456, an increase of 19.6 per cent for the later five-year period and of 60.1 per cent for the decade. The net income, therefore, was \$56,450,930, a sum less by 17.2 per cent than the net income of 1912 but greater by 39.9 per cent than that of 1907. Of the 947 operating companies, 300 paid dividends aggregating \$48,337,435, a decrease of 6.4 per cent as compared with 1912.

#### OBSTACLES TO FULL COMPARISON

The second monetary column in Table II was added by this journal to indicate as far as possible the comparison between the full income statements for 1912 and 1917. It is explained by the Bureau of the Census, however, that a complete comparison is impossible because the schedule for the census of 1917 differed in some respects

	1917	1912
Surplus.....	\$8,113,495	\$16,489,772
Charges for sinking fund and other reserves.....	9,927,578	6,229,136
Balance.....	Deficit \$1,814,083	Surplus \$10,260,636



# Western Railway Club Holds Electrical Night

**Paper by Messrs. Potter and Dodd Shows More Railroad Electrification and Larger Percentage of Steam Line Electrified in America Than in Rest of World—Saving in Coal, Design of Locomotives and Current Collection Considered**

ON MONDAY night, April 21, the Western Railway Club held its first electrical night at the Sherman Hotel, Chicago. A get-together dinner preceded the meeting. The evening was devoted to a paper on "Electrification of Trunk Line Railroads" by W. B. Potter, chief engineer, railway and traction department, General Electric Company, and S. T. Dodd, railway and traction engineering department, General Electric Company.

The paper, an abstract of which appears below, was delivered by Mr. Dodd and was followed by lantern slides of representative American installations explained by Mr. Potter. Mr. Potter also described competitive tests which had been conducted between electric and steam locomotives to the glory of the former. He stated that he believed extensive electrification would soon take place in France and Italy.

In the discussion which followed the slides, E. Marshall, electrical engineer Great Northern Railway, explained various features of the 27 miles of electrification on his road, outlining some of the difficulties resulting from three-phase service. He stated that probably there would be no more three-phase lines built. N. W. Storer, traction engineering division, Westinghouse Electric & Manufacturing Company, emphasized the importance of the conservation of fuel. He said that it is not expected that all the railroads will be electrified, but in many instances the possible advantages are so great that undoubtedly many roads will be electrified soon. Regeneration by electric locomotives, he said, gives ease of control, permits a great saving of power and makes for greater safety of operation. The question of the type of drive appeals strongly to the steam railroad operator, and each line wants to satisfy its own ideas sometimes at the expense of efficiency in operation. The big question now is what is the tendency of the times. What weight of train is to be the future requirement and what will be the limit of demand, e.g., weight, length of train, speed, etc.? Is it necessary that large fleets of freight trains be moved almost simultaneously? On these and other questions the builders of electric locomotives must receive information from railroad operators.

O. C. Cromwell, mechanical engineer, Baltimore & Ohio Railroad, spoke briefly on the electrification of his road. In answer to questions, Mr. Potter explained that the controlling factors as to whether a given railroad should adopt a.c. or d.c. service are the relative cost of maintenance and upkeep and whether constant or variable speed is desired.

Following the discussion a moving picture entitled "The King of the Rails" was run. An abstract of the paper by Messrs. Potter and Dodd follows:

## MAIN LINE ELECTRIFICATION

The subject of main-line electrification is one of world-wide importance but seems to have been recognized especially in the United States, for in spite of our great mileage we have more actual main-line electrification and a greater proportion of our total

mileage electrified than all the rest of the world. The following approximate statements will show this fact:

RAILWAY ROUTE MILEAGE OF THE WORLD	
United States .....	265,218
Europe .....	217,000
Rest of the world .....	230,902
Total .....	713,120

The 265,000 miles in the United States represents about 400,000 miles of single track. To this must be added about 50,000 miles of trolley lines; making the total railway single track in the United States approximately 450,000 miles.

In considering heavy electrification, if we eliminate the electric roads which are devoted strictly to motor car service and include under our category those tracks, both steam road and trolley, which are handling freight and passenger service with electric locomotives, we find in the United States approximately 675 electric locomotives operating over 4875 miles of route, or 8300 miles of electrified track. Compared with this, in all the rest of the world there are approximately 450 electric locomotives operating over 1000 miles of route, or 1750 miles of track. That is, the percentage of electrified route mileage in the United States is about ten times as much as the percentage in all other countries combined.

## REASONS FOR ELECTRIFICATION

Probably the freedom from smoke and cinders has been the definite impelling cause in all the early electrifications. Such systems as the Baltimore Tunnel, the New York Central Terminal at New York, the Detroit River Tunnel and the Cascade Tunnel on the Great Northern, were primarily electrified in order to overcome the disadvantage of smoke.

To-day, however, there is an argument for electrification which within the last two years has been more sharply emphasized than any other. This is the conservation of fuel. When we realize that 25 per cent of the coal mined in the United States is used on its railroads, we see the importance of considering this feature. This, therefore, is the only one among the various reasons for electrification to which we will particularly direct attention.

To present a figure showing the economy of electric operation it is necessary to make some sort of estimate of the ton-miles included in railway traffic. Taking the reports of revenue traffic for the year 1914 and including the estimated tonnage of cars and locomotives, we find that the railway traffic for that year amounted to about 1,000,000,000,000 ton-miles. Out of this, the movement of coal for railway purposes, together with the coal cars and locomotive tenders carrying the same, amounted to about 12 per cent.

The energy demand per 1000 ton-miles for railroad service varies widely under different conditions, but the average on the recently electrified sections is approximately 33 watt-hours at the power house per ton-mile moved over the railroad. For contingencies we might



increase this item approximately 20 per cent and we have assumed in the following table 40 watt-hours per ton-mile as an amply conservative basis for estimating the electric energy.

POWER DEMAND FOR ELECTRIC OPERATION OF STEAM RAILWAYS IN UNITED STATES—1914

Ton-miles excluding tenders but including 25 per cent of the railway coal cars.....	930,000,000,000
Watt-hours per ton-mile (assumed).....	40
Annual energy consumption, kilowatt-hours.....	37,200,000,000
Coal required at central steam power stations at 2.2 lb. per kilowatt-hour, tons.....	40,000,000
Average continuous load, kilowatts.....	4,250,000

The actual fuel used on steam locomotives for the year in question was 128,400,000 tons of coal and 40,000,000 bbl. of oil, or a total coal equivalent of 140,000,000 tons. The preceding table shows that the same tonnage could have been moved with electric locomotives by an expenditure of 40,000,000 tons, a saving of 100,000,000 tons per year. It is difficult to know how to emphasize this conclusion. We admit that the statistics which we have presented are more or less approximate, but the indication that electrical operation of railways in the United States would result in a yearly saving of 100,000,000 tons of coal is in itself a conclusion that, in view of the critical conditions of the last two years, must demand attention. We do not propose to suggest that all the railroads in this country will ever be operated electrically, certainly not within any reasonable time, but the figures to which we have called attention emphasize the importance from this standpoint of considering railway electrification wherever the conditions admit.

The figures given were prepared on the basis of the 1914 reports when the coal production for the country was 513,000,000 tons. Statistics for the last year are not available, but unofficial estimates have indicated that the coal production for 1918 was 685,000,000 tons. All the figures given in the preceding table would presumably be increased by 25 per cent to 30 per cent in order to represent conditions to-day.

#### FURTHER SAVING FROM WATER POWER

Although for purposes of comparison we have devoted considerable space to the saving in fuel that would result from the use of central steam power stations for the operation of railways, it is self-evident that the utilization of water power is more vital to the subject as affording the only known means for effectually conserving our limited fuel supply. At the present time, the water-power development in the United States amounts to about 5,000,000 kw. Knowledge as to the possible future hydraulic development is indefinite, as many of the water-power sites have not been completely surveyed. Estimates as to the presumable ultimate development vary considerably, but are around 50,000,000 kw.

The relative amount of power required for complete railway electrification is less than is usually supposed. A number of power stations capable of delivering 37,200,000,000 kw.-hr. per year with an average twenty-four-hour load of one-half the installed capacity would have an aggregate installation of approximately 8,500,000 kw. The statistics of steam and hydraulic electric power plants in the United States indicate that in 1917 there were installed, in central stations for lighting and power purposes, approximately 9,000,000 kw., in railway power stations 3,000,000 kw., and in isolated stations 8,000,000 kw.; a total installed capacity of about 20,000,000 kw. It is apparent that instead of the prob-

lem being prohibitive in size, there is already installed in the country a power station capacity of more than twice the requirement for operating all the railroads electrically. The power that would be required really is not excessive as compared with the electrical development which has already been accomplished.

The present tendency of modern power development, both steam and hydraulic, is toward the growth of large central power stations and inter-connected distributing systems. These power stations will be situated at points of cheap coal supply or of hydro-electric development, and will furnish power for cities and industries over a wide section. The same systems will also furnish power for the railways in their territory.

The Montana Power Company may be cited as an illustration. This company has twelve hydraulic power stations feeding into a common distribution system at 100,000 volts. The total installed capacity is approximately 175,000 kw. with possible extensions by future development of an equal amount. Power is furnished for lighting and industrial purposes to various cities throughout the state and also to the Chicago, Milwaukee & St. Paul Railway. The average twenty-four-hour power demand for the 440 miles of the Chicago, Milwaukee & St. Paul electrification is only in the order of 15,000 kw. with a maximum of about 28,000 kw.

#### DESIGN OF LOCOMOTIVES

A comparison of American electric locomotive development with European, and particularly Continental, shows a characteristic difference in the method of transmitting the power of the motor to the driving wheels. In America the success attained with the many heavy high-speed motor cars and the utilization of these cars in many cases for hauling trains, naturally led to the building of similar equipment for locomotive purposes only. This type of locomotive is the most economical design, but as the tractive effort is transmitted through the truck center pin, this type is commonly limited to a weight of about 60 tons. For heavier locomotives of this type, weighing from 60 to 100 tons, the two trucks are usually connected and the tractive effort transmitted directly through the trucks instead of through the locomotive frame.

The Continental designers, having had little experience with heavy motor-car equipment, were skeptical of gearing and the practice of mounting motors directly on the axle. Their efforts have been mainly directed toward substituting the electric motor for the steam locomotive cylinder, retaining all of the side rods and adding a few more. There is a difference, however, between driving side rods from a steam piston and from a motor-driven crank, which does not seem to have been fully appreciated. In a steam engine the maximum stresses and pin pressures, so far as the driving power is concerned, may be predetermined from the piston area and steam pressure. In an electric locomotive, however, having a motor-driven crank and side rods, the maximum stresses are influenced by variations in the wheel centers and the wear of bearings. The mechanical design must be strong enough to withstand the driving torque at 45 deg. angle from the center, and at as much less angle as may result from the variations. As an extreme illustration, with one side stripped and the other on dead center, the stresses would be in excess of any practicable design.



The Continental locomotives show many variations of the side-rod drive, both with the jack cranks direct driven by the motor through parallel rods or by means of gearing. Comparing only the most important trunk-line electrifications in Europe and America, we find that out of nine European railroads operating 210 locomotives, there are represented twenty-eight different types, while out of fourteen American railroads operating 364 locomotives only twenty-one types are represented. The cause for this difference is to be found in the historical development outlined herein and in the fact that the American development has largely been determined by commercial reasons.

The design of American locomotives for low speed freight and passenger service has been influenced largely by the heavy motor car with motors geared directly to the driving axle. A gearless motor which could develop as tractive effort a proportion of the weight on the axle comparable to the geared motor would furnish a still simpler design. Recent developments along this line indicate the possibility of such a gearless low-speed locomotive at a comparable price.

The design of electric locomotives for high-speed passenger service at 60 to 80 m.p.h. is a more complicated problem. A substantial saving through the elimination of turntables and incident delays being obtained by designing the locomotive double ended and capable of running equally well in both directions, this desirable requirement involves features of design differing from that of a steam locomotive built for operation in one direction only.

A feature in the design of a double-ended locomotive is to control the lateral oscillation and to minimize its effect on the track. This characteristic is more in evidence on tangent track where the flanges of the guiding wheels are free to move within the clearance, than on curves where the flanges of these wheels bear firmly against the outer rail. This characteristic also appears, though in a different form, in the single ended steam locomotive, as the front and rear ends are not both subjected to the reactionary influence of two guiding trucks. In any event the wheels at the front and rear ends must be relied upon to withstand the effect of these lateral oscillations.

In a double-ended locomotive with guiding trucks at each end, any lateral oscillation will deliver a thrust at the truck center plate both at the front and rear ends. The roll of the locomotive body has little tendency to transfer weight to the outside guiding wheels and, therefore, has but little effect in holding down the outer rail. The lateral movement of the locomotive, however, does increase the weight transferred to the outside guiding wheels in proportion to the height of the center plate above the rail head.

The problem presented is to design a double end locomotive with leading and trailing trucks which shall have sufficient guiding force for the front end and with such characteristics as to minimize the cause and effect of lateral oscillations.

To minimize the cause of lateral oscillations the front and rear trucks should be restrained so far as possible from any individual movement, other than that essential to proper guiding of the locomotive. Experience has demonstrated that a two-axle truck with an articulated connection accomplishes this desired result much more effectually than either a two-axle bogie or pony truck.

To minimize the effect of lateral oscillations the characteristics should be such that the truck will allow

a time element during delivery of the thrust against the rail head and such that any lateral thrust at the center pin will produce a large vertical component at the outer guiding wheels. Raising the bearing point or center plate of guiding trucks to 60 in. or 70 in. above the rail head has shown by tests that these characteristics can be obtained in that manner. We wish to direct attention to the fact that a successful double-ended high-speed locomotive can only be obtained by a proper study of the front and rear trucks.

For high-speed passenger service with speeds of the order of 60 to 80 m.p.h. if a locomotive is equipped with geared motors the gear reduction approaches a small ratio, if the armature is to be kept within practical rotative speeds. This presents all the disadvantages of increased weight due to gears with their cost of maintenance without the compensating advantage of the increase in tractive effort usually gained by gear reduction. Consequently, it appears to us that for such speeds and for such service the gearless motor with the armature mounted directly on the axle presents the best solution. The bipolar gearless motors on the New York Central Railroad which have been in service for twelve years have shown very low maintenance.

#### COLLECTION OF CURRENT

The trolley pole and wheel which has so well served the electric railway is not well adapted for the heavy service we have been considering, nor is it a convenient device for movement in both directions. The pantograph collector which requires no attention on reverse movement has long been used, but it is only within the past few years that its capacity as a collecting device has been fully demonstrated. Rolling and sliding contacts have both been tried with results distinctly in favor of the slider. The wear of the working conductor or trolley wire is due far more to the destruction by arcs at the point of contact than from the mechanical friction, hence it is most important that the wire be so supported as to eliminate any rigid spots which are the usual cause of this arcing. The wire should be lifted slightly and really supported by the collector rather than that the collector should run underneath a wire held in rigid relation to its support. Lubrication of the collecting surface not only reduces the wear but seems slightly to improve the contact presumably because of less tendency to chatter than with bare metal. The amount of current that can be successfully collected seems limited only by the current capacity of the working conductor. Tests have shown no arcing at the contact with 3000 amp. at 30 m.p.h., and 2000 amp. has been collected with equal success at more than 60 m.p.h. A copper conductor with copper wearing strips on the collector has been found to give the best results. Measurements taken on the Milwaukee Railway indicate the working conductor will have a life of more than 100 years before it will have to be replaced because of wear.

#### REGENERATION

Regeneration as used in this connection implies the use of electric braking and the utilization of the energy in the train as electric power, which is fed back into the distributing system. The train on a down grade drives the motors as generators, which is comparable to the action of falling water in a hydroelectric power station. Regeneration is of especial advantage on the long grades encountered in mountain districts. Grades of 20 to 50 miles in continuous length are found on almost all the



railway lines crossing the Continental Divide. It eliminates the surging in the train and the variations of speed which are encountered in holding the train by air brakes. In addition to this, the wear of brakeshoes is eliminated and the delays which are often due to overheated brakeshoes on long grades are also avoided. The electric braking takes place entirely at the front end of the train, taking up all slack, and permits the air reservoirs to remain fully charged in reserve for emergency.

The amount of power returned to the trolley by regeneration varies with the amount of the grade and the type of train. On specific tests it has been shown that a train on a 2 per cent grade has regenerated 42 per cent of the power required to pull the same train up the grade. On a 1.66 per cent grade 23 per cent has been regenerated. The records for a particular month over the entire Rocky Mountain Division of the C. M. & St. P. for both freight and passenger trains show that the regeneration was equivalent to 11.3 per cent of the total power used.

## A Franchise Is a Binding Contract

Supreme Court Decides in Columbus Railway Case that Unprofitableness Is No Excuse for Non-Execution

A DECISION was rendered by the United States Supreme Court on April 14 in the case of the Columbus Railway, Power & Light Company, appellant, vs. the City of Columbus, et al. The case arose over the right of the company to surrender and cancel two franchises, one passed on Feb. 4, 1901, and the other on Jan. 1, 1901, each for twenty-five years. These franchises called for the sale of eight tickets for 25 cents with universal transfers. The company declared that owing to an increase in its operating expenses the gross earnings of its railway lines for the year ending June 30, 1919, will fall short by approximately \$250,000 of paying expenses, depreciation and taxes, leaving nothing for fixed charges or any return to the company on the value of its property. Part of the increase in operating expenses, *i. e.*, \$560,000, was because of an increase in wages ordered by the National War Labor Board. The company set forth the importance to the federal railroad and military authorities of the maintenance by it of good service as a public utility and that the existing rates of fare were inadequate and confiscatory and that it desired to charge 5 cents for a single ride and 1 cent for a transfer.

### THE DECISION HOLDS THE CONTRACT BINDING

The court first considered jurisdiction and held that on account of federal questions involved it could act.

It then held that the franchise, after being accepted by the company, was a binding contract, citing in support *Cleveland vs. Cleveland Railway Company*, 194 U. S. 512. Continuing, the court said:

We can have no doubt that under the authority of the laws referred to and in view of the terms of the ordinances in question and the acceptances by the grantees the city of Columbus made valid and binding contracts with the companies, binding for the term of twenty-five years. By these contracts, obligatory alike upon the city and the company, the city granted the right to use the streets and the company bound itself to furnish the contemplated service at the rates of fare fixed in the ordinances. We cannot agree with the contention of the appellant that these were permissive franchises, granted and accepted with the right upon the part of the company to abandon the uses and purposes for which the franchises were granted

because the rates fixed became unremunerative as alleged in the amended bill. The authority under which the city acted came from the State, and was granted by proper statutes passed for that purpose. The contracts were made between the city and the company, and became mutually binding for the period named in the ordinances. This case does not involve the remedies which may be invoked against a street railway company which is or may become insolvent because of conditions arising since it entered into a given contract. The company seeks now by its own action to terminate the contracts, still binding upon it by their terms as to rates of fare to be charged, and seeks to have the aid of a court of equity by enjoining the city from any further requirement of service under them.

There is no showing that the contracts have become impossible of performance. Nor is there any allegation establishing the fact that taking the whole term together the contracts will be necessarily unprofitable. This case is not like the *Denver Water Works* case, 246 U. S. 178, and the *Detroit Street Railway Company* case, 248 U. S. 429, in both of which the franchise to use the streets of the city had expired by limitation, and it was sought to require continued operation of a water-works system in the one case and in the other of a street railway system, under rates which would afford no adequate return to the companies. In this case the company seeks the aid of a court of equity to avoid contracts duly made and entered into while the same are yet in force.

We are unable to find in the allegations in this bill any statement of facts which absolves the company from the continued obligation of its contracts unless the facts to which we have referred bring the case, as is contended, within the doctrine of *vis major*, justifying the company in its attempt to surrender its franchise, and be absolved from further obligation.

### NOT LIKE "KRONPRINZESSIN CECILIE" OR MILWAUKEE CASES

We come then to consider whether the amended bill shows the happening of an event or events which have released the company from the obligations of the contract, and authorized it to cancel the same upon the surrender of its franchise. Justification for that course is said to exist in the conditions following the World War and resulting therefrom, particularly, in the great increase in wages by the arbitral award of the National War Labor Board which was due to the necessity of meeting the high cost of living as a direct result of war conditions. This, it is contended, presents a situation that made the subsequent keeping of the contract practically impossible except at a ruinous loss to the company. It is insisted that the principle recognized by this court in *Kronprinzessin Cecilie*, 244 U. S. 13, when applied to this case shows the existence of conditions excusing the performance of the contract. In that case it was held that the master and owner of the German steamship *Kronprinzessin Cecilie* were justified in apprehending that she would be seized as a prize if she completed her voyage to Plymouth and Cherbourg on the eve of the war, and her return to this country was a reasonable and justifiable precaution in view of the situation; that there was no liability for the shipments of gold agreed to be carried in that case; that the contract, not making an exception in the event of war intervening before delivery of the cargo, the circumstances showing peril of belligerent capture afforded an implied exception to the carrier's undertaking.

Much reliance is had by the appellant on the language used by Mr. Justice Jackson speaking for this court in *Chicago, Milwaukee & St. Paul Railway vs. Hoyt*, 149 U. S. 1, 14, 15, wherein it was said: "There can be no question that a party may by an absolute contract bind himself or itself to perform things which subsequently become impossible, or pay damages for the nonperformance, and such construction is to be put upon an unqualified undertaking, where the event which causes the impossibility might have been anticipated and guarded against in the contract, or where the impossibility arises from the act or default of the promisor. But where the event is of such a character that it cannot be reasonably supposed to have been in the contemplation of the contracting parties when the contract was made, they will not be held bound by general words, which, though large enough to include, were not used with reference to the possibility of the particular contingency which afterward happens."

Particular reliance is had upon the last sentence of the paragraph just quoted. This language was used in interpreting a contract of doubtful import, as the context shows. Such interpretation was made in view of the situation of the parties at the time when the contract was made, and in view of the nature of the undertaking under consideration.



It certainly was not intended to question the principle, frequently declared in decisions of this court, that if a party charge himself with an obligation possible to be performed, he must abide by it unless performance is rendered impossible by the act of God, the law, or the other party. Unforeseen difficulties will not excuse performance. Where the parties have made no provision for a dispensation, the terms of the contract must prevail. *United States vs. Gleason*, 175 U. S. 588, 602, and authorities cited; *Carnegie Steel Company vs. United States*, 240 U. S. 156, 164, 165. The latest utterance of this court upon the subject is found in *Day vs. United States*, 245 U. S. 154, in which it was said: "One who makes a contract can never be absolutely certain that he will be able to perform it when the time comes, and the very essence of it is that he takes the risk within the limits of his undertaking. The modern cases may have abated somewhat the absoluteness of the older ones in determining the scope of the undertaking by the literal meaning of the words alone. The *Kronprinzessin Cecilie*, 244 U. S. 12, 22. But when the scope of the undertaking is fixed, that is merely another way of saying that the contractor takes the risk of the obstacles to that extent."

After quoting from one or two other cases in support of its conclusions the court said:

It is undoubtedly true that the breaking out of the World War was not contemplated, nor was the subsequent action of the National War Labor Board within the purview of the parties when the contract was made. That there might be a rise in the cost of labor, and that the contract might at some part of the period covered become unprofitable by reason of strikes or the necessity for higher wages might reasonably have been within their contemplation when the contract was made and provisions made accordingly. There is no showing in the bill that the war or the award of the War Labor Board necessarily prevented the performance of the contract. Indeed, as we have said, there is no showing, as in the nature of things there cannot be, that the performance of the contract, taking all the years of the term together, will prove unremunerative. We are unable to find here the intervention of that superior force which ends the obligation of a valid contract by preventing its performance. It may be, and taking the allegations of the bill to be true, it undoubtedly is, a case of a hard bargain. But equity does not relieve from hard bargains simply because they are such. It may be that the efficiency of the service and fairness in dealing with the company which performs such important and necessary service ought to require an advance in rates; such was the strongly announced opinion of the National War Labor Board. But these and kindred considerations address themselves to the duly constituted authorities having the control of the subject matter.

We reach the conclusion that the District Court was right in holding that this bill presented no grounds absolving the company from its contract, and justifying the surrender of its franchise. It follows that the decree is affirmed.

## American Welding Society Progressing

The American Bureau of Welding, to operate under the auspices of the American Welding Society, was organized on April 11 with C. A. Adams as director, H. M. Hobart and A. S. Kinsey as vice-directors, W. E. Symons as treasurer and H. C. Forbes as secretary. Regular meetings of the bureau are to be held on the third Friday of each month. The bureau voted to establish a research committee and appointed fifty-two men representing a wide variety of interests to the committee. The membership of the committee will be augmented from time to time as needed.

Among the members of the research committee are experts from manufacturing companies and governmental and other bureaus. Included are men from the Bureau of Standards, Lloyds' Register of Shipping, National Research Council, Electrical Testing Laboratory, Massachusetts Institute of Technology, Stevens Institute of Technology, United States Navy Yard, University of Illinois, Lehigh University, University of Vermont and American Bureau of Shipping.

## Why Gasoline Can't Compete in City Service

**Gasoline Cars Cannot Coast or Stand without Consuming Much Fuel, Thus Raising Average Unit Consumption to Extremely High Figures**

BY F. KINGSLEY

THERE seems to be some questioning of my last week's reference to gasoline as a prohibitively costly fuel. Also, the fact (mentioned at the same time) that gasoline may cost seven times as much as electricity for surface car operation appears to be too strong a medicine for our persistent radicals to swallow—if we may term as radicals those who insist that electricity as a motive power belongs to a past era. In consequence, I wish to submit, in detail, the derivation of the figure referred to, together with the remark that, so long as the proponents of the gasoline engine kept it on rubber tires we were at a disadvantage because there were a lot of things about automobiles that we didn't understand. However, now that the gasoline engine has been suggested in all seriousness for rail traction it becomes possible to make direct and accurate comparisons of gasoline and electricity.

To do this we need to start only with the assumption of a pair of similar cars, one with gas drive and the other with electric motors which consume, say, 1 kw.-hr. per car mile. Details as to size and weight of car are unimportant, although it may be remarked that such an energy consumption would be expected from a typical one-man car of about the same size as the one with which Henry Ford is going to revolutionize our industry. Details regarding speed and stops per mile are also unimportant except in so far as they affect the duration of what electric railway operators generally call length of unit run.

Here it becomes necessary to descend to first principles by pointing out that a street car, contrary to common impression, does not progress from one end of the line to the other at a constant and leisurely rate. Instead, its progress is made up of a series of relatively short jumps, or unit runs, which are made between stops. These runs may have a length of only one block or may be extended to eight or ten blocks, depending upon the wishes of riders to alight or pedestrians to ride. In general, however, experience has shown that for city operation the average run has a length of the order of 600 ft., and a duration of, say, forty-five seconds. Each of these runs is made up of a cycle of operations that is invariable in its order. First, there is a rapid acceleration (in modern cars sometimes reaching 2.5 m.p.h.s.); then the power is shut off and the car "coasts," gradually losing speed as it runs under momentum; then when the next stopping point is almost reached the brakes are applied hard so as to bring the car to a halt as quickly as possible after the brakes go on; finally there is a stop of several seconds while passengers get on and off. Then the whole cycle is repeated, with only such changes as are necessitated by changing distances between stops and interferences by vehicles or unfortunate pedestrians.

### POWER REQUIRED FOR ONLY 22 PER CENT OF TIME

Without going into too exhaustive details, it may be said that the rule of rapid acceleration has been demonstrated beyond any shadow of doubt. If acceleration is slow the car doesn't gain a high running speed before



it is time to apply brakes for the next stop, and if the running speed is low the average speed, or schedule speed, is also low, and slow schedules mean high costs and accelerated receiverships. Also, paradoxical as it may be, rapid acceleration is economical of power. In brief, rapid acceleration is an essential of surface car operation. To obtain it, 50 hp. of motors have been placed on recent 7-ton cars. And these motors frequently may be called upon for 75 hp. under unfavorable starting conditions, since overload capacity is a recognized characteristic of electric motors, if not of the gas engine.

As a result of this requirement it is invariably the case that a modern surface car demands a large amount of power during a short period of acceleration and then demands no power at all during the other operations within each cycle or unit run. The duration of the period of acceleration may be said to be ordinarily not far from ten seconds with reasonably modern equipment. The duration of the remainder of the average cycle would thus be thirty-five seconds. City railway motors, then run in cycles roughly approximating full load for 22 per cent of the time and no load for 78 per cent of the time. This condition applies whether the motive power is electricity or gasoline. And also it is the condition which prevents the modern internal combustion engine, marvelous as it is, from ever displacing electricity for general city car operation, because the gas engine cannot run idle without using fuel.

To elaborate, the modern gas engine is a four-cycle machine. The pistons get an impulse only once in four strokes. Naturally the mechanical efficiency is not high, being of the order of 75 per cent. Consequently, when the engine runs at "no load," something like one-fourth as much energy is required to keep the engine turning over at speed as is required to pull the full load. In addition, the thermal efficiency at light loads is low and the unit fuel consumption is roughly doubled. An authority states that in explosion engines the total no-load consumption ranges from 30 per cent to 45 per cent of the total consumption at normal load. Making allowance for the various factors such as reduced turnover speed, irregular operation, careless handling and sloppy maintenance which may be expected in street car service, it is at least safe to take the lower of the above figures for the fuel consumption during the 78 per cent idle time.

#### ELECTRICITY, 1.5 CENTS; GASOLINE, 10.5 CENTS

Unit fuel consumption for an automobile engine under full load test seems to range from 0.8 lb. to 1.2 lb. of gasoline per brake-horsepower per hour, so that 1 lb. per horsepower-hour may be adopted as an average during the acceleration period of the hypothetical gasoline-driven street car in question. During the idle time the rate of consumption would then be 30 per cent of 1 lb., or 0.3 lb. for each horsepower developed at full load, but since the idle time is 3.5 times as long as the power-on period the total consumption while idling would be 1.05 lb. of gasoline for each horsepower-hour developed during the power-on period.

Losses from motor to wheels may be assumed to be the same for both electric and gasoline motors, as this gives the latter a little the best of it, and in consequence the power actually delivered is measured by the input to the electric motor on the one hand and by the fuel supply to the gas engine on the other. If the cars on

which the two are mounted are similar, energy demands will be equal and costs directly comparable.

For the electric car the input has already been assumed at 1 kw.-hr. per car-mile, which, at thirty-five per cent load factor, could be purchased from any power company for about 0.9 cent, and, including an allowance of 0.6 cent for conversion, the total cost at the car would be 1.5 cent. For an exactly similar gasoline-driven car the energy consumption will also be 1 kw.-hr. per car-mile, or 1.34 hp.-hr. per car-mile. This, multiplied by the previously determined unit fuel consumption of 2.05 lb. per horsepower-hour, produces a car-mile consumption of 2.75 lb. Incidentally, this is the equivalent of 2.1 miles per gallon of gasoline. If the price of gas is taken at the not-unreasonable figure of 22 cents per gallon, the cost per pound of gas would be 3.8 cents. Finally, 2.75 lb. of gas per car-mile at 3.8 cents per pound makes a total cost of 10.5 cents per car-mile for the fuel for the gas-driven car. This is seven times the cost of 1.5 cents for moving the electrically driven car.

A word may be advisable in regard to the editorial on the subject appearing in the last issue of this paper. In this the cost of gasoline fuel "under the most favorable conditions" was cited as being 4 cents per car-mile for a 7-ton car (evidently not a 70-ton car as the linotype made it). Such a figure could be obtained on the assumption of a 16-cent fuel, which we might get, although it doesn't exist yet for automobiles; a forty-second power-on period in a 100-second run, which would correspond to an extremely easy service involving something like three stops per mile; a 20 per cent no-load fuel consumption; and a full-load fuel consumption of 0.8 lb. per horsepower-hour, which figure can be reached by gasoline engines, at least on the test floor. Every one of these conditions is absolutely the most favorable one for the gasoline drive that could be considered as at all reasonable. That all, or in fact that any of such favorable conditions may be expected in commercial operation is highly improbable. In other words, the figures in the editorial gave the electric car the benefit of all doubt.

A word also may be desirable to explain why the above high figures for fuel consumption are not commonly believed to exist in automobile operation. The reason lies in the fact that practically all published statistics for buses hitherto have applied only to conditions involving a negligible frequency of stops and a slow acceleration. Yet the imposition of frequent stops with fast schedules, and the attendant irregular operation of the engine, not only increase the unit fuel consumption of the gasoline motor but also greatly increase the energy input required for the vehicle. Thus, statistics on actual fuel consumption of motor buses published in the *ELECTRIC RAILWAY JOURNAL* four years ago showed that a number of 4-ton buses generally in suburban operation made 4.5 miles per gallon of gasoline. This would be the equivalent of 2.3 miles per gallon for a 7-ton vehicle such as we have been considering, or say 3 miles per gallon if allowance of 30 per cent is made for the saving in rolling resistance if the vehicle is placed on rails. This compares with the 2.1 miles previously derived for severe city conditions and with the 4 miles derived for most favorable conditions.

In conclusion, it is important that recognition be given to the effect of an increase in cost of power such as that above outlined. For a small car, like the general



FARE BOX REGISTER				10C CASH OR ROOKE REGISTER				TICKET REGISTER				DETAIL OF COLLECTIONS			
Reg. No.	Reading	Cash Reg. \$ c		Reg. No.	READING FRONT	Fares Registered	READING BACK	Fares Registered	Reg. No.	Reading	No. Tickets Reg.	Conductor's Report		For Office Use Only	
	Left				Left					Left		Cash & Ticket Collections	Number	Amount \$ Cash c	7c. Tkts (5 @ 35)
	Taken				Taken					Taken		Acc. cash fares on Overhead Reg.			City Zone Day Pupils
	Left				Left					Left		Cash on Fare Box			C & I Z D P C C
	Taken				Taken					Taken		Rooke's Register Front of Bc			C & I Z D P I C (1)
	Left				Left					Left		Rooke's Register Back of Bc			C & I Z D P I C (3)
	Taken				Taken					Taken		Collections with Boston River Checks			C & I Z D P I C (4)
	Left				Left					Left		Metal Tickets on Ticket Reg. 7c			C & I Z D P I C (6)
	Taken				Taken					Taken					Pupils Day Int 1 Zone
	Left				Left					Left					Pupils Day Int 3 Zone
	Taken				Taken					Taken					Pupils Day Int 4 Zone
	Left				Left					Left					City Zone Rye Pupils
	Taken				Taken					Taken					Spec Himpd Ave Pup.
	Left				Left					Left					Ly C Z - Scol Sq (Ly)
	Taken				Taken					Left					Ly C Z - Scol Sq (Int)
	Left				Left					Taken					Ly C Z - Scol Sq (Ch)
	Taken				Taken					Left					Law-Hav C Z (Law)
	Left				Left					Taken					Law-Hav C Z (Int)
	Taken				Taken					Left					Law-Hav C Z (Hav)
	Left				Left					Taken					L.C.T. City Coupon
	Taken				Taken					Left					L.C.T. 1 Inter Zone
	Left				Left					Taken					L.C.T. 2 Inter Zone
	Taken				Taken					Left					L.C.T. Rk-jk Sq R Comp
	Left				Left					Taken					L.C.T. Rk-jk Sq W Cap
	Taken				Taken					Left					L.C.T. 3 Inter Zone
	Left				Left					Taken					L.C.T. Woburn Wak
	Taken				Taken					Left					L.C.T. W.Ly-Reg (On C)
	Left				Left					Taken					

type under consideration, earnings of 25 cents per car-mile would be excellent, and with a direct cost of operation (including only power, labor and maintenance) in the vicinity of 10 cents per car-mile, operation would be profitable. If, however, the gasoline drive was introduced, increasing the cost of power by 9 cents, the cars might just as well be taken off the streets, because they would certainly lose money with receipts of 25 cents and a direct operating expense of 19 cents per car mile. If there are certain peculiar attractions and advantages of the gas-driven car sufficient to increase receipts in proportion to any such increased cost of operation, they have not yet been put forward, and no one with common sense believes that they exist. Consequently the electric railway industry can do no better than to dismiss the whole gas-drive insanity from mind—unless, perhaps, the old plan of the motor-bus line promoters should be revived, and the fuel consumption of small gas cars on easy runs be compared with those of large electric cars operating on a severe schedule. In this case an analysis of the conditions should promptly provide the comparison with a place in the waste basket. As for the question of extremely light cars, which naturally would be favored by the supporters of an extremely costly fuel, this is something solely for the car designer. It is up to him to say whether the use of an extremely light car body that will rack itself to pieces in three or four years will pay for itself by its savings in energy during that period. But in any case the form of this energy must be electricity, because that is by far the cheapest form for city service that is now known.

Designs have been prepared for passenger cars to be operated in Saxony and Prussia with Diesel engines as the prime movers and electric drive for the axles. The engines are placed in the middle with passenger bodies at the ends, the total weight of the car, unloaded, being 64 tons.

BACK OF DAY CARD USED ON THE BAY STATE SYSTEM

## Ten-Cent Fares and 7-Cent Tickets

How They Are Being Collected and Registered on the City and Interurban Lines of the Bay State Street Railway

THE Bay State Street Railway is rapidly introducing metal tickets in place of paper tickets and changing its system of collection in accordance with this plan. Its new fare schedule, which was described on page 161 of the issue of this paper for Jan. 18, is briefly as follows:

### City fares

The cash fare is 10 cents.  
Five tickets are sold for 35 cents.

### Interurban fares

The cash fare for one or two zones is 10 cents and for each additional zone is 5 cents.

A 7-cent ticket is accepted for a ride within one zone.

### Fare for combined city and interurban ride

A passenger traveling from the city zone into one interurban zone, or vice versa, pays 15 cents cash or a 7-cent ticket and 5 cents in cash. Succeeding interurban zones are at the rate of 5 cents each.

### Limited commutation and school tickets

The company has abolished its former workmen's tickets, which were sold at reduced rates, but sells limited commutation tickets good for twenty rides. These tickets have separate coupons for the city and interurban rides, are non-transferable and can be used only during the hours at which wage-earners usually go to and from their work. These tickets and the school tickets which are sold at reduced rates are the only paper tickets issued by the company.

BAY STATE STREET RAILWAY CO.										DAY CARD										Date									
Form T 1155 50M-2-195. WALLACE B. DONHAM RECEIVED										ROUTES RUNNING FROM CITY INTO INTERURBAN TERRITORY										191									
Conductor										Badge No.										Route									
Specify Terminal Points of Route and Exact Time of Leaving and Arriving				For Office Use Only		Time Round Trip		Mileage's Badge No.		Car No.		Actual Cash Run Through Fare Box		Fare Box Reading		Cash On Fare Box		Rooke Register Readings		Trip Turn-in		Passengers Not Registered		City Zone Transfers Closing No.		Interurban Transfers Closing No.		Extension Ride Check's Closing No.	
Starting Point	Time	Destination	Time	h.	m.																								
1	M		M																										
	M		M																										
	M		M																										
1	M		M																										
	M		M																										
2	M		M																										
	M		M																										

FRONT OF DAY CARD USED WITH THE NEW SYSTEM OF FARES ON THE BAY STATE SYSTEM. THE BACK IS SHOWN ABOVE







## Proper Storage Facilities Aid Salvage of Scrap Metal

**The Illinois Traction System Stores and Segregates Its Scrap Metals at a Central Point for Proper Distribution**

**T**HE Illinois Traction System in the yards adjacent to the Decatur shops has recently erected storage facilities for all kinds of scrap metal. A 600-mile interurban system such as this necessarily accumulates a great deal of scrap metal, and rather than have this lying around scattered over various parts of the system it is now all brought to this central point and sorted. Any parts that are good for further use are reclaimed and the remainder is sold in carload lots for junk.

The facilities for handling this scrap material are shown in the accompanying photographs and consist primarily of a building 61 ft. long and 20 ft. wide with an adjoining platform the same width and 120 ft. long. This whole structure is built adjacent to a curved section of switch track.

One end of the building is devoted to the storage of coke, capacity being available for two 80,000-lb. capacity carloads. The coke is shoveled into the building through the four small doors shown in illustration

No. 2, and is taken out through a door at the end of the building. Adjoining the coke room and inside the same building are three other storage bins, one each for steel shavings, foundry ashes and core sand. These materials are dumped into the bins from wheelbarrows through openings at the back as shown in the third view. As the floor of each of these three bins and of the platform beside the building is about level with a car floor, a very gradual incline about 40 in. wide is provided at the back of the building, and up this the barrows are pushed to a horizontal platform about 2 ft. above the bin floors.

The platform adjoining the building is divided by low partitions into five sections in which are stored respectively general scrap iron, all classes of scrap spring material, iron piping, old brakeshoes and broken or worn-out gears and pinions. These materials can be loaded into and unloaded from cars at the front and wheelbarrows at the rear. Holes have been bored in the plank flooring to drain off rain and snow, and a drain below the platform carries this off to the rear of the building. The platform is erected on concrete pier foundations and both the building and platform are side sheathed with matched lumber, the roof of the building being covered with a composition roofing paper.

**VIEWS OF THE FACILITIES PROVIDED BY THE ILLINOIS TRACTION SYSTEM FOR THE STORAGE AND SALVAGE OF SCRAP METAL.**



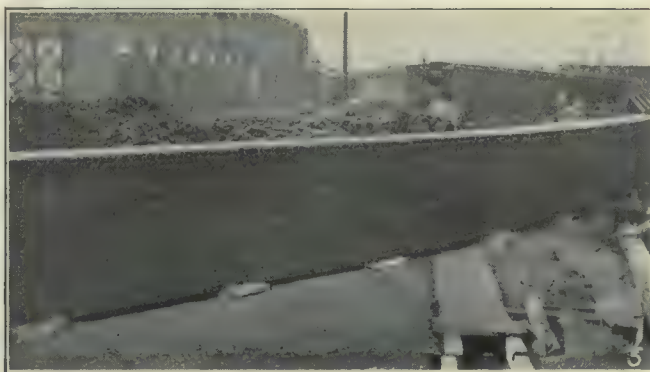
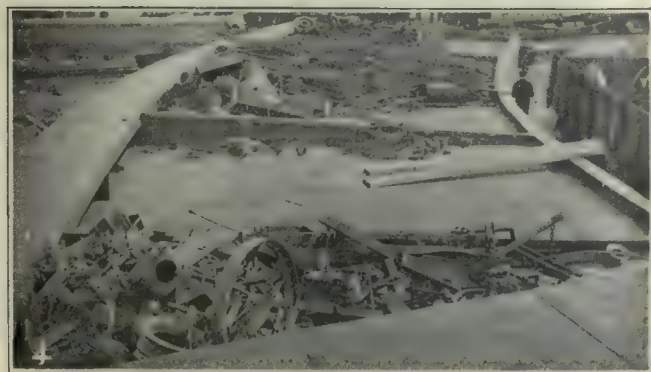
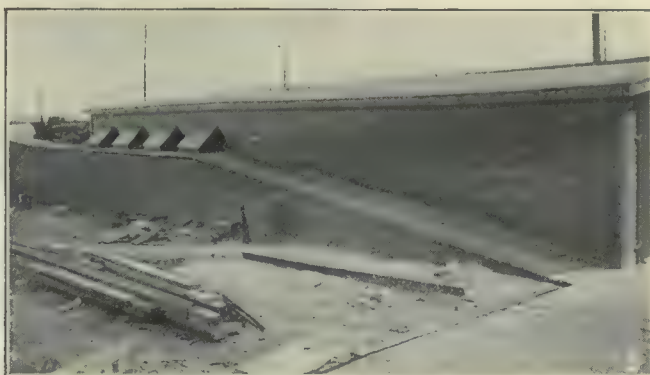
No. 1—Loading scrap materials into coal cars.

No. 2—Front of storage building and platform.

No. 3—Rear of building, showing incline by which the platform is reached with wheelbarrows.

No. 4—Platform on which scrap metals are segregated and stored.

No. 5—Rear of storage platform, showing concrete piers and side sheathing.





## AMERICAN ASSOCIATION NEWS

### Representation at Chamber of Commerce Meeting

**P**RESIDENT PARDEE has appointed a committee of six delegates to represent the American Electric Railway Association at the meeting of the United States Chamber of Commerce next week in St. Louis and to act with Philip H. Gadsden, National Councillor. The members of the delegation are Walter A. Draper, Cincinnati, Ohio; Britton I. Budd, Chicago, Ill. Richard McCulloch, St. Louis, Mo.; Philip J. Kealy, Kansas City, Mo.; Horace Lowry, Minneapolis, Minn.; Edwin C. Faber, Chicago, Ill.; alternates, Thomas Finigan, Chicago, Ill.; Edward B. Meissner, St. Louis, Mo.; Henry W. Blake, New York. The alternate national councillor is H. H. Crowell, Grand Rapids, Mich.

### Collection and Registration of Fares

**T**HE Transportation & Traffic Association committee on collection and registration of fares met in New York on April 24 and "blocked out" its report to be presented at the fall convention. This report will cover the following points as selected by the executive committee (See E. R. J., Feb. 1, 1919, page 244):

The subject selected for one of the sessions is the collection and registration of fares, particularly fractional fares or fares whose payment involves the collection and registration of two or more coins. It is hoped by the committee that this session will be made a joint session with the Accountants' Association, so that the topic may be considered from both the transportation and accounting standpoints. The committee will be instructed to consider the subject both as regards a uniform and a zone system of fares.

The meeting was attended by W. J. Harvie, Auburn, N. Y., chairman (appointed to take the place of R. R. Anderson, who was unable to serve); L. D. Pellissier, Holyoke, Mass.; C. W. Stocks, Boston, Mass., and L. H. Palmer, Baltimore, Md. (sponsor from executive committee).

The committee outlined the field to be covered, dividing it into two sections, one relating to the flat fare and the other to the fare based upon distance traveled. The former was the only one studied in detail at the meeting. In it were included the collection and registration of single coins, multiple coins, metal tickets and paper tickets by all practicable means. The committee aims ultimately to recommend the most approved plans for these purposes in general and special cases.

### Illumination Meeting at Manila

**F**AUSTINO J. MASCARDO, chief clerk of the installation and meters department, Manila Electric Railroad & Light Company, was the speaker at the forty-ninth monthly meeting of the local company section held in Manila on March 4. The speaker outlined the general principles to be applied in indoor and outdoor illumination, traced the history of the art, and showed how electrical illumination is superior to others in many ways. A replica of the first electric lamp made by Mr. Edison, furnished by the General Electric Company, was exhibited.

The attendance at the meeting was unusually good,

250 persons being present, and President Van Hoven announced that a large hall would be secured for an early meeting at which a frolic would be the feature. The March 4 meeting was enlivened with music and humorous dialogs. At future meetings there will be a motion picture show, a pillow fight, a tug-of-war and a few boxing bouts. Mr. Van Hoven outlined a very attractive program for the coming month.

### W. R. Holton Explains Employment Work at Chicago Meeting

**W**. R. HOLTON was the principal speaker at the April 15 meeting of the Chicago Elevated Railways company section, his topic being "The History and Functions of the Employment Department." The talk was illustrated by means of lantern slides. The attendance at the meeting was about eighty persons.

The report of the secretary showed a total membership of 191, sixteen having joined during the current year. There was also an enthusiastic talk on the wisdom and duty of subscribing to the Victory bond issue. Among entertainment features were some humorous recitations and songs and an exhibition of athletic work.

### Government Report on Tests for Color Blindness

**T**HE United States Public Health Service announces that color blindness of a degree dangerous in occupations requiring recognition of colored signal lights occurs in 3.1 per cent of the men and 0.7 per cent of the women in every-day life among healthy individuals in America. It has also reached the conclusion that certain commonly used tests for detection are faulty. With a view of remedying this, a bulletin has just been published for distribution among railroads and steamship lines, setting forth the results of the investigations and recommending several important changes in methods of examination now employed.

Color blindness is best detected by testing with colored lights of known spectral composition. It is of great importance to divide the color blind into the dangerously color blind and the harmlessly color blind. This may be done satisfactorily and expeditiously with the Edridge-Green lantern after an understanding is gained of the principles of the test employed.

The Jennings test is criticised, although it is acknowledged to possess certain practical features which render it superior to other tests in certain lines of examination where great accuracy and classification of color defects are not essential. It should not be used for testing sailors or trainmen. Among refractive conditions of the eye, color blindness occurs least frequently in eyes apparently without demonstrable refractive error; it occurs most frequently in eyes showing mixed astigmatism.

Briefly, the report recommends that the following classes of color blind should not be permitted to be sailors or trainmen: (1) Those possessing a color perception containing three or less units; (2) those possessing a greater number of units than three who have the red end of the spectrum so shortened as to prevent the recognition of red light at a distance of 2 miles; and (3) those with a central scotoma for red and green.



# News of the Electric Railways

FINANCIAL AND CORPORATE • TRAFFIC AND TRANSPORTATION

PERSONAL MENTION

## Insist Upon Wage Payments

**Providence Men Threaten to Go Out on Strike Unless Back Pay Is Forthcoming**

After Presiding Justice Tanner in the Rhode Island Superior Court had decided during the week ended April 19 that State, town and city taxes had priority over the payment by the receivers of the back pay due the employees of the Rhode Island Company, Providence, under an award of the War Labor Board last October, so many complications arose that the justice reversed his decision in Court on April 23 and ordered the receivers to make payment.

### MEN THREATEN TO STRIKE

The original decision was not regarded as final, as May 1 was set as the date for a further hearing on the subject. As a result of the original decision, however, the street railway men's union decided to vote on the advisability of calling a strike in case the payment of the back wages was refused. At this referendum, taken on April 19, the men decided to empower the officers of the union to call a strike whenever it was deemed expedient.

In the meantime, the officers of the union urged the Governor to have the State waive its priority in payment of franchise taxes due. A similar request was made to Mayor Gainer of Providence. Other cities and towns in the State were also asked to waive their rights. Governor Beekman placed the matter before the Legislature and a bill was passed waiving the State's rights. Similarly, the Aldermen of Providence went on record in like fashion.

The union officers then interjected another complication by insisting that the State and municipalities waive their rights to payments not only of franchise taxes but also to the payment of all real estate and personal property taxes.

### MATTER REFERRED TO COURT

Attorney General Rice and City Solicitor Chase of Providence expressed opinions that such action could be legally taken and they so advised Governor Beekman, who had called a meeting of the representatives of all the towns and cities of the State for April 21. This opinion presented an unexpected phase to the dilemma, and the State and municipal authorities adjourned without taking any definite action, believing that the Court alone could solve the problem.

Although May 1 was the date set for a further hearing on the subject, in view of the circumstances which arose, Presiding Justice Tanner advanced the

date to April 23. Clifford Whipple, attorney for the receivers; John J. Fitzgerald, attorney for the union; Elmer S. Chase, City Solicitor of Providence; Herbert A. Rice, Attorney General of Rhode Island; Eugene A. Kingman, of Edwards & Angell, representing the Pawtucket Street Railway, the Rhode Island Suburban Railway and the other companies whose lines were leased to the Rhode Island Company, and Richard B. Comstock, counsel for certain committees of bondholders, were all heard in behalf of the interests which they represent.

Presiding Justice Tanner then said that the taxes due the State were legally a paramount claim, yet the Court had an equitable power to preserve the property of the railway system as a going concern. He said that he believed it to be for the interests of all parties for the court to exercise that power to the extent of granting the petition of the receivers to pay the claims of back wages.

The total amount due the carmen approximates \$144,000. The receivers will probably make payment by May 1.

## Building Loans for Employees

In order to assist its office employees to build or acquire homes during the present scarcity, George Kidd, general manager of the British Columbia Electric Railway, Vancouver, B. C., has placed \$50,000 at the disposal of the British Columbia Electric Office Employees' Association to be loaned at 6 per cent over a term of twelve years.

The scheme is believed to be one of the first of its kind to be launched in British Columbia, if not in the whole of Canada, and it is already being gladly accepted by the company's employees. In explanation Mr. Kidd said:

My reason for making the proposal was to relieve, as far as possible, our employees from the pressure of high rents, give them homes of their own and thereby induce thrift and interest in their community. Many of them have been inconvenienced as are others, by having the homes they rent sold over their heads. Many others feel that paying out rent year after year without a permanent interest in their home is not desirable.

Some of our employees already had lots, but had not the wherewithal to build on them unless at high rates of interest, when the monthly charge for principal and interest would be much heavier than rent. It was these that we hoped to help, and in view of the need for more houses we expect that it will induce some of our employees to build.

The disposal of the fund has been placed in the hands of a joint committee composed of representatives of the office employees' association and the management of the company and the committee has allotted the \$50,000. The employees have named their committee through the association executive.

## Highways Transport Plans

**Eleven Regional Directors of New Committee Represent Business Interests Primarily**

Grosvenor B. Clarkson, Director of the United States Council of National Defense, has announced a reorganization of the Highways Transport Committee to include direct representation from the office of public roads and rural engineering of the Department of Agriculture; the Bureau of Markets of the same department; the Post Office Department, and the Department of Commerce. With this reorganization it is said that close co-operation with the executive departments most vitally interested in matters of highways transportation will be brought about in such a way that the committee will be a clearing house of action for all federal interest concerned.

The committee as reorganized is as follows: John S. Cravens, of the Council of National Defense, chairman; James I. Blakslee, fourth assistant postmaster general; J. M. Goodell, consulting engineer, office of public roads and rural engineering; James H. Collins, investigator in market survey, bureau of markets; R. S. MacElwee, second assistant chief, bureau foreign and domestic commerce; Charles W. Reid, executive secretary; G. B. Clarkson, director of council, ex-officio.

The committee will be assisted by the Highways Transport Committee Advisory Board consisting of William Phelps Eno, Washington, D. C.; Prof. Arthur H. Blanchard, New York; C. A. Musselman, Philadelphia; Raymond Beck, Akron; J. T. Stockton, Chicago.

It is said that the council in addressing itself particularly to the problems growing out of the entrance of the motor truck into the commercial transportation field, will seek to determine just how the motor truck can best be fitted into the nation's existing transportation agencies. Also that it is the policy of the council through its committee to co-operate with all transportation agencies with the view of determining how transportation needs can be served most efficiently, speedily and economically, and to aid in the promotion of motor express lines through territory now served inadequately by the transportation agencies.

The council will, Director Clarkson states, co-operate with the United States Railroad Administration in the study of the short-haul problem, and will also give specialized attention to the relation of the rural motor express to interurban electric railways and waterways traffic, in the interest of all elements concerned.



## Disappointing Legislative Session in New York

### Principal Electric Railway Relief Measure Fails—Work of Legislature Not Satisfactory

The Legislature of New York has ended with a record of very little accomplished and much condemnation from all sides of that little. Nobody seems satisfied, the Democratic Governor least of all. On the one hand the Progressives express disappointment at the results and on the other hand, the Republicans, who were in control, profess not to be pleased. The Governor, aided by a few Republicans that he won over, made a bold fight for his program of social welfare measures, but he was outmaneuvered by the opposition, and won out on only one minor bill.

#### FARE BILL FAILS

There were several measures of much interest to the electric railways on the program, but the outstanding ones were the Carson-Martin fare bill and the plan for changes in Public Service Commission control. The Carson-Martin bill, the purpose of which was set forth in the report of the hearing on the measure in the *ELECTRIC RAILWAY JOURNAL* for March 15, page 542, passed the House, but failed in the Senate. Thus the prospect of relief for the electric railways by action by the Public Service Commissions with respect to increases in fares is precluded. There was much sentiment in favor of the bill, but at almost the closing hours came the charges by Senator Thompson, chairman of the public service committee of the Senate, about a so-called slush fund. These charges, though fully discredited by the testimony presented at the subsequent hearings, probably affected the fate of this measure. In fact, many of the Senators objected to voting on the Carson-Martin fare bill because of the charges.

#### ONE-COMMISSION MEASURE ENACTED

On April 18 the Assembly passed and sent to the Governor for his approval the bills of James F. Foley, Democratic leader of the Senate, providing for a reorganization of the Public Service Commission for the First District of New York into a single-headed commission and creating a rapid transit commissioner, whose duties will be to complete the building of New York's subways.

Governor Smith asked the Legislature to pass measures affecting both of the commissions, but it refused to comply with this request or to accede to the Governor's recommendation that the Public Service Commission for the Second District be reorganized. The Governor will not name the Public Service Commissioner until he signs the measures, so the names will not be sent to the Senate for confirmation. Next year, however, the appointments will have to be referred to that body.

Under an emergency message from the Governor the group of tax bills

prepared by the Davenport special tax committee were passed. With the returns from these measures it is hoped to meet the deficit caused by the loss of excise revenue—some \$24,000,000—and the growing cost of government. One of these bills imposes a State income tax, following closely the lines of the federal measure with respect to regulations but much less burdensome in its imposts.

#### MANY INTERPRETATIONS OF "BLUE SKY"

The Foley "blue sky" bill passed the Senate unanimously, but died in the Assembly. It provided that before any stocks or securities could be sold in the promotion of a corporation a verified statement must be filed with the Secretary of State setting forth all the money paid as commission and other information to prevent the launching of fraudulent ventures. It seems to be generally agreed that some measure of this kind is needed, but the task proved too great of reconciling all the divergent interests that would come within the purview of legislation of this kind. Everybody is agreed that there should be legislation of this kind wisely administered, but there are many kinds of thought on what is wise and what unwise. In view of the failure of this program the financial sharks appear to be in for another period of immunity in which to carry on their nefarious practices.

#### CONDUCTORETTE BILL DEAD

The Senate killed the "so-called" conductorette bill, leaving the measure regulating the employment of elevator women the only measure on the Governor's "social welfare" program to go through.

### Los Angeles, Oakland and Sacramento Wages Increased

Wage increases were awarded by the National War Labor Board on April 11 to employees of the Los Angeles (Cal.) Railway Corporation, the San Francisco-Oakland Terminal Railways, Oakland, Cal., and the Pacific Gas & Electric Company, Sacramento. Requests of employees of the San Francisco-Oakland Terminal Railways, the San Diego Company and the Los Angeles Corporation for an eight-hour day, and of the workers of the Pacific Gas & Electric Company for a nine-hour day were refused by the board.

The board recommended that motormen and conductors of the Los Angeles company be granted wages of 41 cents an hour for the first three months' employed, 43 cents an hour for the next nine months, and 45 cents an hour thereafter.

The board awarded employees of the San Francisco-Oakland Terminal Rail-

ways a scale ranging from 43 cents to 50 cents an hour. The increase included in the scale is retroactive to Nov. 1, 1918, and payable before Sept. 1, 1919. Time and a half was awarded by the board to trainmen who are called upon to perform extra work.

For employees of the Pacific Gas & Electric Company the board recommended a new wage scale granting conductors and motormen wages ranging from 42 cents to 46 cents an hour with the stipulation that operators who are assigned by the company to run one-man cars should receive an additional 5 cents an hour.

The award is retroactive as of Jan. 1, 1919, with back payments under it due before next June 1. Trainmen are granted time and a half for overtime under the conditions of the award.

The raises granted amount to a 14 per cent wage increase for the platform men of the Traction and Key Route divisions of the San Francisco-Oakland Terminal Railways. The rate per hour for employees of the San Francisco-Oakland Terminal Railways under the award as compared with the old scale is:

TRACTION DIVISION		
	Old, Cents	Award, Cents
First three months.....	38	43
Next nine months.....	40	46
Thereafter.....	42	48

KEY SYSTEM		
	Old, Cents	Award, Cents
First year.....	43	First three months 45
Second year.....	44	Next nine months 48
Third year.....	45	Thereafter..... 50

### Wheeling Proceeding to Reconstruction

The West Penn Traction Company, Pittsburgh, Pa., controlling the Wheeling Traction System, operating between Moundsville, W. a., and Steubenville, Ohio, will locate its central carhouse and machine shop in South Warwood, near Wheeling. The buildings will cover a space of 10 acres.

When the Wheeling lines were in the hands of the Kuhn interests, Warwood was under consideration as a site for the carhouses and shops. Ten lots were afterward purchased in North Warwood for the carhouse, but residents objected to the location of the plant and the shops were never erected.

The original brick structure housing the cars is at Beech Bottom. With the construction of the new carhouse and shops, Warwood will be a convenient home for the workmen in the shops and for the conductors and motormen on the Pan Handle line. The city of Wheeling, centrally located, will soon have suburban lines running in all directions and connecting with Columbus, Cleveland, Cincinnati and Pittsburgh.

Anticipating this development, it has been arranged to provide for larger carhouses and shops for the company. Hence the location of the new works at Warwood.



## Wages Advanced in San Francisco

The Board of Public Works of San Francisco, Cal., on April 16 recommended an increase of pay for motormen and conductors of the Municipal Railway of 50 cents a day. That means an increase from \$4 to \$4.50 for eight hours. The new rate was made effective as of April 15. This recommendation was made with the understanding that if the net income of the railway is insufficient to meet this added expense the difference is to be made up from the depreciation fund. There is now about \$1,000,000 in cash in the depreciation reserve fund. About \$1,000,000 has already been extracted from this fund for extensions.

The United Railroads, San Francisco, with which the Municipal Railway is in competition, has just established a new wage scale for platform men, effective from April 13. This supersedes the old scale, which ranged from 37 cents to 45 cents. Both old and new scales involve a ten-hour basis. The new scale is as follows: First six months, 42 cents; second six months, 44 cents; second year, 46 cents; third year and thereafter, 48 cents.

## Missouri Industries Organize

The Associated Industries of Missouri, representing the combined industrial and manufacturing interests of the State, was organized in Kansas City on April 14 for the protection of the interests of manufacturers and of the industries in general. It proposes to encourage new industries and capital. Railroad development will be one of the particular things advanced.

One of the prime considerations will be the promotion of co-operative relations between employers and employees. The chief interest of the association will be to make Missouri the strongest industrial state in the Union. The organization is based upon the plan of the Illinois Manufacturers' Association. P. J. Kealy, president of the Kansas City Railways, was one of the organizers.

These officers were elected: President, A. J. Davis, president of the St. Louis Employers' Association, St. Louis; first vice-president, Conrad Mann, president of the Kansas City Brewery Company; second vice-president, C. A. Battereall, wholesale shoes, St. Joseph; third vice-president, W. J. Dysart, Springfield; treasurer, John S. Green, St. Louis; secretary, W. C. Rogers, St. Louis.

## Kansas City Elevated Doomed

The old west bottom elevated railway is doomed if the two Kansas Cities will agree to it. For years surface cars have run over it from Kansas City, Mo., to Kansas City, Kan., or what in former days was known as Wyandotte. It has been in service for years, but has deteriorated very much. Now the Kansas City Railways has asked the City Councils of the two cit-

ies to allow the section between Mulberry and the West line to be demolished. Kansas City, Mo., has acquiesced and it is now up to the Kansas side. The railway would like to tear the structure down because in its present condition it is considered a source of danger. That portion passing over the railroad tracks, however, would be retained. Should Kansas City, Kan., agree to the request, cars from Missouri would pass through the tunnel, and later drop easily to a surface track. The change would bring better service. The two cities would have better accommodations over the new Inter-City Viaduct.

## What's in a Name?

The proposal of Frank Hedley, vice-president and general manager of the Interborough Rapid Transit Company, New York, N. Y., to claim for his company the exclusive right to use the designation "subway" has provoked no end of comment in the daily press of New York. The merits of the issue aside, much that is petty and witty has been tossed off by the paragraphers. Mr. Hedley is in complete accord with Shakespeare in the sentiment that "he that filches from me my good name steals that which not enriches him and makes me poor indeed." The New York Herald said:

Mr. Hedley proposes that his company shall have the exclusive right to the word "Subway," and that all other companies shall have an otherwise unrestricted choice from a voluminous dictionary. Could anything be more generous?

All that the other traction chiefs need do is to lay hold of a phrase, introduce one or more capital letters, and the deed is done. Or, if so inclined, they might invent a word to suit their case and get a no-trespass copyright for it. For instance, the "Walloway," the "Lowline," the "Belowline," the "Underway," the "Holloway," the "Concavity," the "Trough," the "Dipway," the "Lacuna," the "Sink," and ever so many others might be suggested.

But we warn Mr. Hedley and all the other nomenclators that the public frequently appropriates the right to give names to public utilities of everyday use. From its decisions there is no appeal. It will name the new Interborough lines and all the other lines according as it thinks they should be characterized.

## Wages and Fares Coupled in Chicago

The attitude of the board of operation of the Chicago (Ill.) Surface Lines, as reported to the employees' organization on April 17, is that a continuation of the wage scale established by the War Labor Board is dependent upon the company procuring the increase in fares which has been asked of the State Utilities Commission. This statement was made in answer to an appeal of the employees for protection against a reduction in the wage scale at the end of the war.

L. A. Busby, president of the company, made it plain in his letter that the choice is between a higher fare, lower wages and a receiver for the properties. He said:

We agree with you that it is unfair to ask you as employees to bear part of the unjust burden of attempting to maintain our transportation service at less than cost. We believe you will agree with us that it

is also unfair to ask the companies to continue under present conditions to pay the present wage scale, which was granted upon the recommendation that an adequate increase in fares should follow.

There have been various rumors about the position to be taken by the State commission on the fare appeal. These were mostly to the effect that the commission would insist on reducing the capitalization on which a return is to be allowed. None of these reports has been confirmed.

## Cleveland-Youngstown Line Assured

Bankers have announced that the Van Sweringen line, the Cleveland & Youngstown Railroad, will be completed between Shaker Village and East Thirtieth Street, Cleveland, Ohio, by early fall. Finances, they said, had all been arranged, but this could not be confirmed, as O. P. and M. J. Van Sweringen are out of the city.

The line will come down Kingsbury Run in the city and at East Thirtieth Street will connect with one of the Cleveland Railway lines, over which cars will be routed to the Public Square or some other turning point until the proposed new union station is completed.

The Cleveland Railway is now operating cars over what is known as the Shaker Boulevard line. One of the branches to be completed is the South Moreland. The new line will furnish rapid transit service to a large residence territory and make further real estate development possible on the heights southeast of the city proper.

## New Investment Bankers' Committees

O. B. Willcox, vice-president Bonbright & Company, New York, and chairman of the committee on public service securities of the Investment Bankers' Association of America, has announced the appointment of the following sub-committees:

**Street Railways and the Investor's Interest:**  
Russell Robb, chairman, Stone & Webster, Boston.

G. M. Dahl, Chase Securities Corporation, New York.

Claude K. Boettcher, Boettcher, Porter & Company, Denver.

R. Lancaster Williams, Middendorf, Williams & Company, Baltimore.

**Canadian Public Service Securities:**

R. B. Young, chairman, E. H. Rollins & Sons, Boston.

J. A. Fraser, Dominion Securities Corporation, Ltd., Toronto.

James C. Willson, James C. Willson & Company, Louisville.

Chester Corey, Harris Trust & Savings Bank, Chicago.

**Public and Municipal Ownership from the Investor's Standpoint:**

R. Lancaster Williams, chairman, Middendorf, Williams & Company, Baltimore.

F. E. Frothingham, Coffin & Burr, Inc., Boston.

James S. Riley, Perrin, Drake & Riley, Inc., Los Angeles.

Claude K. Boettcher, Boettcher, Porter & Company, Denver.

**Credit and Financing of Public Service Companies, Including Cost of Money:**

Chester Corey, chairman, Harris Trust & Savings Bank, Chicago.

James S. Riley, Perrin, Drake & Riley, Inc., Los Angeles.

Russell Robb, Stone & Webster, Boston.

F. E. Frothingham, Coffin & Burr, Inc., Boston.

G. M. Dahl, Chase Securities Corporation, New York.



## News Notes

### Newark Jitney Men Will Organize.—

The jitney owners representing every line in Newark, N. J., and all lines to the suburbs, with the exception of Kearny, met in Newark on April 16 and, after a long discussion, decided to form an organization to protect their interests. A man from each of the lines was chosen to organize his fellows. Another general meeting will be held at which plans will probably be worked out looking toward a permanent organization.

**Another Attempt at Norfolk Franchise.**—The tentative draft of the new franchise to be submitted to the Virginia Railway & Power Company has been completed by attorneys for the city of Norfolk, Va., and forwarded to the officials of the company at Richmond. The franchise will take the place of the various franchises under which the company is operating at present. It extends the time on all and is said to give the city authorities increased power of regulation. After officials of the company have had time to study carefully the provision suggested by the city a joint conference will be held.

**Seattle Elevated Tested.**—Thomas F. Murphine, Superintendent of Utilities of Seattle, Wash., recently authorized the operation of a street car over the new municipal elevated railroad, to test the structure. He did this following a request of City Engineer A. H. Dimock. The special work for the connection of the surface and elevated lines at First Avenue and Washington Street is now being made, and it is expected will be ready in two weeks. When completed, the west side cars will be routed over the elevated, cutting down the running time fifteen to twenty minutes.

**Wants Municipal Line Taxed.**—The Chamber of Commerce, Seattle, Wash., in a recent communication to the City Council, urged that the municipal railway system be charged with the taxes formerly paid on railway property by the Puget Sound Traction, Light & Power Company, pointing out that unless other arrangements are made, these taxes will be charged against the general property owner. It is suggested that the utility should be charged with \$300,000 general and \$90,000 gross revenue tax, the same as the private corporation. Members of the utilities committee and the City Council are said to be against the proposal as presented.

**Dismissed for Lack of Jurisdiction.**—The appeal of the employees of the St. Paul (Minn.) City Railway against

the Twin City Rapid Transit Company for increased pay has been dismissed by the National War Labor Board for lack of jurisdiction. The decision read: "It appearing the complainants have failed and neglected for more than two months to take any steps toward final prosecution of this case and that their attention has been called to the necessity of taking active steps in the matter, and that reasonable opportunity was given them to do it, therefore it is hereby directed that said case be dismissed without prejudice for want of jurisdiction."

### Preparing Wheeling Wage Demands.

—The executive committee representing employees of the West Virginia Traction & Electric Company, the Pan Handle Traction Company, the City Railway and the Wheeling (W. Va.) Traction Company has been holding a series of meetings at Wheeling to consider wage and other conditions to be inserted in the contract to be presented to the management of the companies for joint action by the men and the railway officials. The men will probably ask for a considerable increase in wages. It is expected that the attitude of the railways will be that they must have additional revenue, to be derived from increased fares, if they are to be called upon to increase wages.

**Portland Men Want More.**—Trainmen of the Portland Railway, Light & Power Company, Portland, Ore., are reopening the question of wages, demanding increases that amount to about 10 cents an hour. The present wages are 46, 48 and 50 cents an hour. The new demands call for 55, 58 and 60 cents. When the question of wages for railway workers was adjudicated by the War Labor Board last October, it was stipulated that either the employing company or employees might reopen the matter at six-month intervals. April 1 marked the first date on which negotiations for a change in scale might be started anew. Franklin T. Griffith, president of the company, states that it cannot consider making wage increases at this time. It is said this will mean that the matter will again go before the War Labor Board for adjustment.

**Pasadena Defeats Municipal Ownership.**—Pasadena, Cal., seems to have had its fill of municipal ownership. It already owns the local electric light plant and the water system, and had in contemplation the construction of a high-speed municipal electric railway between the city and Los Angeles. That project, however, was abruptly halted by being voted down at the election on April 3. The project was ambitious. It called for an issue of \$3,000,000 of bonds, with mere construction costs for the new line placed at \$2,777,107. These were regarded as big figures for Pasadena. Proponents of the measure insist that the vote must be taken as a repudiation of this particular project and not as a rebuke to municipal ownership as such, particularly in view of the excellent facil-

ities afforded by the Pacific Electric Railway for communication between the cities.

**Appointments to Seattle Legal Department.**—Walter F. Meier, Corporation Counsel of Seattle, Wash., has appointed several new members of his department, to assist in the municipal railway legal work. Every appointment has been given to men who have had overseas experience, or who have been engaged in war work. Capt. Ewing Colvin and Capt. Nelson T. Hartson have been appointed assistants to the Corporation Counsel, to fill vacancies caused by the transfer of two members of the department to handle the legal end of the railway claims and personal injury cases. Three appointments have also been announced by Counsel Meier to the railway claim department. Although the Council made appropriation for salaries for several other positions in the legal department, Corporation Counsel Meier said he will not make appointments until an increase in business necessitated them.

**Sounds a M. O. Warning.**—In a report of the bureau of taxation of the Seattle Chamber of Commerce and Commercial Club, attention is called to the obligation of the city government to conduct the municipal electric railway at a profit and turn into the general fund an amount sufficient to offset the loss of approximately \$400,000 of taxes and franchise revenues which would be paid by the system under private ownership. In concluding its statement the bureau says: "Unless the railway system is so conducted as to furnish the necessary service without increasing the tax rate, the property owners of the city, including the owners of homes and industrial plants, will be called upon to help pay part of the transportation expense of the general public in addition to their own, and investment of outside capital in Seattle, essential to our rapid development, will be made more difficult to secure by increase in a tax rate already high."

**M. O. Defeated in Sioux Falls.**—With the re-election of Mayor G. W. Burnside, after serving sixteen years, the special submissions of purchase of the local railway lines and the gas company property were defeated. The attitude of Roger Mills, secretary and manager of the Sioux Falls (S. D.) Traction System, toward municipal ownership was noted in the *ELECTRIC RAILWAY JOURNAL* for April 19, page 807. There was no quibbling by the local railway as to where it stood. In one advertisement during the campaign the company, which by the way used space very liberally, said bluntly: "More lines, more cars, more paving and more frequent service are financially out of the question with us at the present time. If this is what the people of Sioux Falls demand, then you should vote 'Yes' at the coming election. Your vote against the proposition is an indorsement of the present management, the rate of fare and the service that we are giving you."



# Financial and Corporate

## Planning Spokane Merger

After Several Years of Discussion  
Ordinance Is Being Drawn with  
This End in View

The general terms of a proposed ordinance to be submitted to a vote in Spokane, Wash., for a franchise under which the local lines of the Washington Water Power Company and the Spokane Traction Company, which is included in the Spokane & Inland Empire Railroad, will be consolidated have been agreed upon by the officials of the companies.

### MR. HUNTINGTON THE VEHICLE

Under the tentative plan approved by counsel for both companies, to be submitted to Mayor Fassett and the City Commissioners soon, the preamble will read: "To grant to D. L. Huntington, his heirs and assigns the right to build, equip, purchase, own and operate a single or double-track electric railway system upon certain streets in the city of Spokane."

Mr. Huntington in turn will agree to organize immediately a corporation to acquire the present railway systems of the Washington Water Power Company and the Spokane & Inland Empire Railroad, merge them and eliminate certain trackage.

It is further to be provided that the city charter will be so amended as to relieve the railway systems from certain burdens of expense in the way of paving, bridge taxes and other compensations to the city.

Mr. Huntington will be allowed a stipulated number of months in which to accept the ordinance and meet the requirements of its various provisions. The acceptance of the ordinance by Mr. Huntington will terminate all other ordinances and franchises previously granted both companies. In a general way the proposed ordinance will follow the provisions of the last franchise granted the Washington Water Power Company by the city in 1910.

### FARES TO BE SUBJECT TO REGULATION

In the ordinance submitted by the companies, as now considered, there will be no reference to the precise streets upon which the franchise to operate cars will be granted, but the list of streets will be left to the City Council and the Mayor to designate in a supplemental ordinance as an amendment to the proposed ordinance of the carriers.

The rates of fare to be charged are to be fair, just and reasonable and subject to regulation in the manner provided by law.

The matter of universal transfers is to be stipulated free from extra cost except that the transfer will not be given on a parallel line less than six

blocks away from the car upon which the passenger is riding. The charge for a transfer in this case, if one is demanded by the passenger, is to be fair, just and reasonable and subject to regulation in the manner prescribed by law. Members of the fire and police department in uniform are to be carried free.

The franchise will run for twenty-five years from the date of acceptance.

A rough draft of the proposed franchise has been prepared by Frank T. Post, counsel for the Washington Water Power Company, and Ben. F. Kizer, representing the Spokane & Inland Empire Railroad, and informal conferences have been held by the officials of the companies.

## Looking Into Future

Frederick J. H. Kracke, a member of the Public Service Commission for the First District of New York, estimates that before 1950, New York City will require to transport its population a rapid transit and street railroad system four times as great as at present. Mr. Kracke bases his estimate upon a careful analysis of traffic figures covering the last fifty-nine years in New York, and upon municipal population statistics for a still longer period.

The population of Greater New York in 1950, Mr. Kracke estimates, will be 12,556,106 persons, and the passenger traffic upon elevated, subway and street surface lines, if some new transportation method is not devised in the meantime, will be more than 8,000,000-000 persons annually. These computations are based upon an estimated population of 5,525,497 persons in New York City at the close of the fiscal year 1917-1918 in which period about 1,975,511,709 passengers were carried on the traction lines. This would indicate that more than 2,000,000,000 passengers will use local transit facilities during the current fiscal year. The rate of growth of traffic is much greater than the rate of increase in population. While the population has grown 26 per cent to 39 per cent a decade, ratios for street railroad passengers have increased from 49 per cent to 200 per cent.

These conclusions are contained in an opinion by Commissioner Kracke, in which the Belt Line Railway Corporation is authorized to abandon certain of its unused or little used tracks. In authorizing this abandonment Mr. Kracke points out that if the vast and growing population in New York is properly to be cared for from the transportation standpoint, useless and outworn lines must be abandoned and the companies relieved of their maintenance in order that funds may be concentrated upon the development of facilities much more useful and beneficial.

## Bay State Property Sold

955-Mile Electric Railway System Sold  
Under the Hammer to the Re-  
organization Committee

The property of the Bay State Street Railway, Boston, Mass., which company operates in ninety cities and towns in eastern and southeastern Massachusetts and extends into New Hampshire and Rhode Island, was sold at auction on April 21 at Salem, Mass., by order of the Federal Court, under the reorganization plan by which the property is eventually to be in the hands of the Eastern Massachusetts Railway, and managed by five public trustees provided for by a special act of the Legislature.

### BANKER THE PURCHASER

The purchaser was Arthur I. Glidden, representing Lee, Higginson & Company, Boston, Mass., reorganization managers for the railway, and the price was \$3,000,000, subject to the taking over of various obligations, including those of the Bay State receivership and mortgages of the Boston & Northern Street Railway and the Old Colony Street Railway.

The reorganization plan provides for \$3,582,633 of new cash from stockholders and scaling down \$20,000,000 of capitalization to conform to the public control act. Its terms were reviewed in the *ELECTRIC RAILWAY JOURNAL* for March 15, page 538. Briefly the total of securities of the successor company bearing fixed charges will be \$29,352,700 while the grand total of capitalization will be \$52,396,950, the difference between these sums being made up by \$4,097,000 of preferred stock and sinking fund stock, \$2,998,500 of new preferred "B" stock, \$8,719,000 of new adjustment stock (cumulative) and \$7,229,750 of new common stock.

The plan of reorganization, when put into effect, will permit the acceptance of the special legislative act of 1918. The trustees will have absolute power to fix fares sufficient to pay a return covering all interest requirements, the stated dividends on the preferred stocks and 6 per cent on the common stock of the new company. Based upon the Public Service Commission's appraisal of \$40,282,340 in its decision of Aug. 31, 1916, plus subsequent additions, the property valuation will be about \$46,000,000, on which \$2,760,000 is the approximate amount of the permitted initial annual return.

### STATE'S CREDIT PLEDGED

The credit of the State is pledged for the payment of the principal of not exceeding \$4,000,000 of serial mortgage bonds of the new company maturing within ten years from the date of issuance. The act requires that \$2,500,000 of these bonds be sold immediately so as to produce \$2,500,000 cash, of which \$2,000,000 must be used for future additions and improvements and \$500,000 set aside as a reserve fund; and that \$1,000,000 of cash additional



must be realized from the sale of other securities of the new company and applied to the rehabilitation of the properties or to other corporate purposes. This makes a total of \$3,500,000 of new cash which must be obtained, as a prerequisite to the formation of the new company under the act.

The proposed capitalization of the new company conforms to the act, so that the permitted return will always be sufficient to pay all fixed charges and regular dividends.

## Readjustment in Indianapolis

### Proposal Toward That End Now Before Committee of Stockholders of the Indianapolis Street Railway

The appointment of a committee of fifteen stockholders of the Indianapolis (Ind.) Street Railway to report on May 8 on a plan in harmony with the suggestions of the Indiana Public Service Commission's order of Dec. 28, 1918, in so far as the same may be practicable and feasible, is regarded as the first step toward the financial readjustment of local Indianapolis lines which the Indiana Public Service Commission directed to be made when it issued an order allowing the company to charge a 5-cent fare.

The order was made in the case of the Indianapolis Traction & Terminal Company, which holds a lease of and operates the property of the Indianapolis Street Railway. Following this order the Indianapolis Traction & Terminal Company postponed the payment of interest on the \$6,000,000 of Indianapolis Street Railway bonds when the interest fell due on Jan. 1, 1919. It did, however, pay the semi-annual lease rental, or dividend of \$150,000, to the Indianapolis Street Railway. Under the provisions of the mortgage securing the bonds there are six months of grace, which will end on July 1.

This committee was appointed at the annual meeting of the stockholders of the Indianapolis Street Railway held on April 10. The committee is composed of J. F. Wild, Edward L. McKee, Walter J. Ball, E. K. Willman, John W. Smith, Frank Donner, H. W. Bennett, Robert Elliott, George C. Hitt, W. A. Hough, Otto N. Frenzel, Samuel Reid, Samuel T. Murdock, M. J. Ready and H. H. Hornbrook.

The membership of this committee can be increased to include any large stockholder of the Indianapolis Street Railway. The directors were re-elected, as follows: Henry Jameson, Indianapolis; John W. Smith, Muncie; Harold J. Hibben, Indianapolis; Winfield T. Durbin, Anderson; Walter J. Ball, Lafayette; Charles M. Murdock, Lafayette, and Joseph A. McGowan, Indianapolis.

The above stockholders' committee has appointed a sub-committee, composed of Messrs. Wild, Willman, Frenzel, Murdock and Ball, to draft plans embodying the suggestions contained in the Public Service Commission's order of Dec. 28, 1918.

## Statistics for January

### Comparative Figures for 1919 and 1918 in a New Form Show How Cost of Doing Business Has Risen

Operating statistics of electric railways reporting monthly to the information bureau of the American Electric Railway Association are given in the accompanying tables in a somewhat different form than that used heretofore.

Table I shows the income statement and car-miles for fifty-nine companies for January, 1919, as compared with January, 1918. Formerly only the revenues, expenses, net taxes and operating income were shown. Table II is also an operating statement, but in this case the amounts per car-mile are given. The companies represented are the same as those in Table I.

Table III is a detailed statement of the operating expenses of fifty-five companies. In Table IV the amounts per car-mile of the operating expenses shown in Table III are presented.

Tables V, VI, VII and VIII correspond respectively to Tables I, II, III and IV and give the operating statement and detailed operating expenses, for January, 1919, of 105 companies. Tables V and VII give the actual totals, while Tables VI and VIII give the same amounts per car-mile. The companies shown include those appearing in the first four tables and in addition forty-six others for which the 1918 figures were not available.

#### BEST SHOWING IN SOUTH

As in the past, the returns from city and interurban electric railway companies have been classified according to the following geographical grouping: Eastern District—East of the Mississippi River and north of the Ohio River. Southern District—South of the Ohio River and east of the Mississippi River. Western District—West of the Mississippi River.

The operating statement in Table II indicates that the Eastern district was the only one to improve its condition. The good showing made in this district, however, was probably due more to the unfavorable conditions in 1918 caused by the heavy winter weather than to any actual improvement in operating conditions in 1919.

The Western district seems to be going from bad to worse. The balance after the payment of taxes and fixed charges dropped from a net income of 1.02 cents per car-mile in 1918 to a deficit of 0.10 cent per car-mile in 1919. An increase of 21.86 per cent in operating expenses and nearly 18.00 per cent in taxes were largely responsible for the poor showing made.

#### SOUTH LOSING GROUND

In the South conditions are slowly becoming worse. Operating expenses increased 31.82 per cent, and the net revenue fell off 3.82 per cent. Taxes increased 16.30 per cent, and although the fixed charges decreased 7.45 per cent the net income dropped from 3.77

cents per car-mile to 3.11 cents in 1919, a decline of 17.51 per cent.

Although the Southern district seems to be losing ground, as shown above, it still makes by far the best showing of the three districts. The net income of 3.11 cents per car-mile compares very favorably with 0.08 cents per car-mile in the East and a deficit of 0.10 cents per car-mile in the West.

#### OPERATING EXPENSES JUMPED

The details of operating expenses given in Table IV help to explain the depressing situation reflected in the previous tables. Practically every account shows a large increase since January, 1918. The decisions of the War Labor Board are reflected in the increase in conducting transportation, which for the country as a whole rose from 9.51 cents per car-mile in January, 1918, to 12.23 cents per car-mile in January, 1919, an increase of 28.60 per cent. The greatest increase in this item is shown in the South, 38.08 per cent, while the highest actual figure per car-mile appears in the East, 13.49 cents, and the lowest in the West, 10.58 cents.

The cost of power shows an increase for the country as a whole of 12.97 per cent, rising from 4.24 cents per car-mile in January, 1918, to 4.79 cents per car-mile in January, 1919. This, of course, reflects the rise in the price of coal and the higher wages of labor. The Western district shows the greatest increase in this account, 44.64 per cent compared with an increase of 2.90 per cent in the East and a decrease of 1.34 per cent in the South. The favorable showing of the East and South in this respect is probably due to the storms of 1918 in the East which reduced the output and increased the cost per car-mile, while the increased cost in the West is partially explained by the great amount of haulage necessary at the increased freight rates.

#### MAINTENANCE INCREASES HEAVY

The maintenance of way and structures and equipment shows heavy increases, reflecting the high cost of materials and also the high wages prevailing. For the country as a whole the way and structures account increased 12.98 per cent and the equipment account 25.18 per cent. The greatest increase in these accounts was in the South, being 50.62 per cent and 61.18 per cent respectively. The actual expenditure per car-mile for equipment was, however, less in the South than in the other districts, being 2.74 cents per car-mile as compared with 3.08 cents per car-mile in the West and 4.28 cents in the East. For way and structures the actual expenditure per car-mile was 3.84 cents in the East, 2.44 cents in the South and 2.22 cents in the West.



TABLE I—INCOME STATEMENT FOR FIFTY-NINE ELECTRIC RAILWAYS FOR JANUARY, 1919, COMPARED WITH JANUARY, 1918

	United States		East		South		West	
	1919	1918	1919	1918	1919	1918	1919	1918
Railway operating revenues.....	\$8,242,651	\$7,220,956	\$3,330,226	\$2,983,510	\$1,204,345	\$946,735	\$3,708,080	\$3,290,711
Railway operating expenses.....	6,464,859	5,398,330	2,766,909	2,471,011	860,183	611,505	2,831,767	2,315,814
Net operating revenue.....	1,777,692	1,822,626	563,317	512,499	338,062	335,230	876,313	974,897
Net revenue from auxiliary operations.....	17,412	4,927	480				16,932	4,927
Taxes.....	564,858	507,505	197,747	202,758	121,770	97,935	245,341	206,812
Operating income.....	1,229,246	1,320,048	366,050	309,741	216,292	237,295	647,904	773,012
Non-operating income.....	402,984	393,036	169,226	156,939	192,740	197,461	41,018	38,636
Gross income or loss.....	1,632,230	1,713,084	535,312	466,680	409,032	434,756	688,922	811,648
Deductions from gross income.....	1,524,019	1,522,600	527,988	525,990	296,708	300,430	699,323	696,180
Net income or loss.....	108,211	168,384	7,324	*59,310	112,324	134,326	10,401	115,468
Car-miles operated.....	23,560,028	23,404,022	8,482,909	8,606,460	3,789,862	3,551,712	11,287,511	11,245,850

TABLE II—INCOME STATEMENT IN CENTS PER CAR-MILE FOR FIFTY-NINE ELECTRIC RAILWAYS SHOWN IN TABLE I FOR JANUARY 1919, COMPARED WITH JANUARY, 1918

	United States			East			South			West		
	1919	1918	Per Cent Increase	1919	1918	Per Cent Increase	1919	1918	Per Cent Increase	1919	1918	Per Cent Increase
Railway operating revenues.....	34.99	30.85	13.42	39.25	34.67	13.21	31.77	26.65	19.21	32.85	29.26	12.27
Railway operating expenses.....	27.44	23.07	18.94	32.62	28.71	13.62	22.70	17.22	31.82	25.09	20.59	21.86
Net operating revenue.....	7.55	7.78	2.96	6.63	5.96	11.24	9.07	9.43	3.82	7.76	8.67	10.50
Net revenue from auxiliary operations.....	0.07	0.02	250.00	0.01						0.15	0.04	275.00
Taxes.....	2.40	2.17	10.60	2.33	2.36	1.27	3.21	2.76	16.30	2.17	1.84	17.93
Operating income.....	5.22	5.63	7.28	4.31	3.60	19.72	5.86	6.67	12.17	5.74	6.87	16.45
Non-operating income.....	1.71	1.68	1.79	1.99	1.82	9.34	5.08	5.56	8.79	0.36	0.34	5.88
Gross income or loss.....	6.93	7.31	5.20	6.30	5.42	16.24	10.94	12.23	10.65	6.10	7.21	15.40
Deductions from gross income.....	6.47	6.51	0.62	6.22	6.11	1.80	7.83	8.46	7.45	6.20	6.19	0.16
Net income or loss.....	0.46	0.80	42.50	0.08	*0.69		3.11	3.77	17.51	*0.10	1.02	109.80
Car-miles operated.....	23,560,028	23,404,022	0.68	8,482,909	8,606,460	1.44	3,789,862	3,551,712	6.70	11,287,511	11,245,850	0.36

TABLE III—OPERATING EXPENSES OF FIFTY-FIVE ELECTRIC RAILWAYS FOR JANUARY, 1919, COMPARED WITH JANUARY, 1918

	United States		East		South		West	
	1919	1918	1919	1918	1919	1918	1919	1918
Operating expenses.....	\$6,397,528	\$5,293,975	\$3,264,069	\$3,282,288	\$957,287	\$677,563	\$2,032,983	\$1,690,601
Way and structures.....	695,633	617,275	387,334	404,433	103,546	67,333	204,753	145,509
Equipment.....	831,185	662,452	431,911	395,362	116,578	70,568	284,696	196,522
Power.....	1,128,013	996,671	679,078	672,716	62,651	61,701	386,284	262,254
Conducting transportation.....	2,876,983	2,234,926	1,359,810	1,082,179	538,965	381,704	978,208	771,043
Traffic.....	36,491	43,297	11,101	11,172	10,538	3,099	14,852	29,026
General and miscellaneous.....	827,364	739,354	394,899	359,949	125,009	93,158	307,456	286,247
Transportation for investment—Cr.....	141	34	64	34			77	
Car-miles operated.....	23,524,443	23,499,362	10,082,296	10,271,496	4,249,170	4,152,960	9,242,977	9,074,906

TABLE IV—OPERATING EXPENSES IN CENTS PER CAR-MILE FOR FIFTY-FIVE ELECTRIC RAILWAYS SHOWN IN TABLE III FOR JANUARY, 1919, COMPARED WITH JANUARY, 1918

	United States			East			South			West		
	1919	1918	Per Cent Increase	1919	1918	Per Cent Increase	1919	1918	Per Cent Increase	1919	1918	Per Cent Increase
Operating expenses.....	27.19	22.53	20.68	32.38	31.96	1.31	22.53	16.31	38.14	23.55	18.63	26.41
Way and structures.....	2.96	2.62	12.98	3.84	3.94	2.53	2.44	1.62	50.62	2.22	1.60	38.75
Equipment.....	3.53	2.82	25.18	4.28	3.85	11.17	2.74	1.70	61.18	3.08	2.17	41.94
Power.....	4.79	4.24	12.97	6.74	6.55	2.90	1.47	1.49	1.34	4.18	2.89	44.64
Conducting transportation.....	12.23	9.51	28.60	13.49	10.54	27.99	12.69	9.19	38.08	10.58	8.50	24.47
Traffic.....	0.16	0.18	11.11	0.11	0.11		0.25	0.07	257.14	0.16	0.32	50.00
General and miscellaneous.....	3.52	3.14	12.10	3.92	3.50	12.00	2.94	2.24	31.25	3.33	31.15	5.71
Transportation for investment—Cr.....												
Car-miles operated.....	3,524,443	23,499,362	4.53	10,082,296	10,271,496	1.85	4,249,170	4,152,960	2.32	9,242,977	9,074,906	1.85

TABLE V—COMBINED INCOME STATEMENT OF ONE HUNDRED AND FIVE ELECTRIC RAILWAYS FOR JANUARY, 1919

	United States	East	South	West
Railway operating revenues....	\$19,684,757	\$13,848,372	\$1,347,003	\$4,489,382
Railway operating expenses.....	15,583,167	11,152,007	971,420	3,459,734
Net operating revenue.....	4,101,590	2,696,265	375,583	1,029,648
Net revenue from auxiliary operations.....	302,175	151,264	125,554	25,357
Taxes.....	1,295,378	864,925	141,149	289,304
Operating income.....	3,108,387	1,982,704	359,982	765,701
Non-operating income.....	514,939	245,807	195,866	73,266
Gross income or loss.....	3,623,326	2,228,511	555,848	838,967
Deductions from gross income.....	4,060,078	2,836,224	333,860	889,994
Net income or loss.....	*436,752	*607,713	221,988	*51,027
Car-miles operated.....	50,642,071	32,593,495	4,326,290	13,722,286

TABLE VI—INCOME IN CENTS PER CAR-MILE FOR THE ONE HUNDRED AND FIVE COMPANIES SHOWN IN TABLE V

	United States	East	South	West
Railway operating revenues....	38.87	42.49	31.13	32.72
Railway operating expenses.....	30.78	34.22	22.45	25.21
Net operating revenue.....	8.09	8.27	8.68	7.51
Net revenue from auxiliary operations.....	0.60	0.46	2.90	0.18
Taxes.....	2.56	2.65	3.26	2.11
Operating income.....	6.13	6.08	8.32	5.58
Non-operating income.....	1.02	0.76	4.52	0.53
Gross income or loss.....	7.15	6.84	12.84	6.11
Deductions from gross income.....	8.01	8.70	7.72	6.48
Net income or loss.....	*0.86	*1.86	5.13	0.37
Car-miles operated.....	50,642,071	32,593,495	4,326,290	13,722,286

TABLE VII—OPERATING EXPENSES OF ONE HUNDRED AND TWENTY-THREE ELECTRIC RAILWAYS FOR JANUARY, 1919

	United States	East	South	West
Operating expenses.....	\$16,327,010	\$11,599,504	\$1,134,148	\$3,593,358
Way and structures.....	1,711,789	1,211,637	116,455	383,697
Equipment.....	2,068,983	1,467,716	135,041	466,226
Power.....	2,611,794	1,956,782	70,713	584,299
Conducting transportation.....	7,683,973	5,451,294	636,956	1,595,723
Traffic.....	72,407	32,500	11,514	28,393
General and miscellaneous.....	2,178,211	1,479,639	163,475	535,097
Transportation for investment—Cr.....	141	64		77
Car-miles operated.....	53,218,125	34,272,200	4,325,584	14,620,341

TABLE VIII—OPERATING EXPENSES IN CENTS PER CAR-MILE OF ONE HUNDRED AND TWENTY-THREE ELECTRIC RAILWAYS SHOWN IN TABLE VII FOR JANUARY, 1919

	United States	East	South	West
Operating expenses.....	30.68	33.85	26.22	24.58
Way and structures.....	3.22	3.54	2.69	2.63
Equipment.....	3.89	4.28	3.12	3.19
Power.....	4.91	5.71	1.63	4.00
Conducting transportation.....	14.44	15.91	14.73	10.91
Traffic.....	0.14	0.09	0.27	0.19
General and miscellaneous.....	4.09	4.32	3.78	3.66
Transportation for investment—Cr.....				
Car-miles operated.....	53,218,125	34,272,200	4,325,584	14,620,341

NOTE—\* Means loss; figures in *italics* indicate decrease.



## Boston Still Losing

Cost Per Passenger in March, However,  
Cut to 8.92 Cents as Compared  
with 9.30 Cents in February

The financial report for the month of March, just made public by the trustees of the Boston (Mass.) Elevated Railway, shows that the cost was 8.92 cents for each passenger carried on the system. The net loss for the month was \$224,920, as compared with a loss of \$285,124 in February and a loss of \$219,269 in January.

### \$1,178,436 A MONTH FOR WAGES

The total receipts from all sources for March, as shown in detail in the accompanying statement, were \$2,331,614. Of this amount \$2,279,683 came

#### RECEIPTS AND COST OF SERVICE OF BOSTON ELEVATED RAILWAY FOR MARCH, 1919

<b>Receipts:</b>	
From fares.....	\$2,279,683
From special cars, mail pouch service, express and service cars.....	7,293
From advertising in cars, on transfers, privileges at stations, etc.....	24,438
From other railways for use of tracks and facilities.....	3,647
From rent of buildings and other property.....	5,510
From sale of power and other revenue.....	7,768
<b>Total receipts from direct operation of the road.....</b>	<b>\$2,328,342</b>
Interest on deposits from securities, etc.....	3,272
<b>Total receipts.....</b>	<b>\$2,331,614</b>
<b>Cost of service:</b>	
Maintaining track, line equipment and buildings.....	\$232,766
Maintaining cars, shop equipment, etc. Power, including 26,439 tons of coal at \$5.917 or \$156,440.....	244,884
Depreciation.....	228,977
Transportation expenses (including wages of car employees, carhouse expenses, etc.).....	167,000
Salaries of administrative officers.....	821,989
Law expenses, injuries, damages, and insurance.....	7,083
Other general expenses.....	107,772
	74,687
<b>Total operating expenses (of which \$1,178,436 represents wages).....</b>	<b>\$1,885,160</b>
Taxes, proportion.....	88,161
Rent for leased roads (exclusive of subways).....	215,785
Proportion of rent of subways and tunnels to be paid to the city of Boston (exclusive of Cambridge Subway owned by company).....	126,638
Interest on Boston Elevated bonds and notes.....	118,666
Miscellaneous items.....	2,142
Proportion of dividends under acts of 1918.....	116,997
Interest on unpaid taxes.....	2,982
<b>Total cost of service.....</b>	<b>\$2,556,535</b>
<b>Net loss.....</b>	<b>\$224,920</b>

from fares, the revenue passengers numbering 28,652,645. The total cost of service for the month was \$2,556,535, of which \$1,178,436 was expended for wages.

#### RECEIPTS PER PASSENGER 8.138 CENTS

The receipts per revenue passenger were 8.138 cents. Of the cost of service per passenger, of 8.923 cents, 4.113 cents represented the cost of labor. The total of 8.923 cents in March compared with 9.304 cents in February, 8.970 cents in January, 8.055 cents in December, and 8.961 cents for the nine months ended March 31, 1919.

The receipts under the 8-cent fare in March, 1919, as compared with the 5-cent fare in March, 1918, show an

increase of \$677,658 or 42.30 per cent, as compared with 44.85 per cent in February (1919), 43.71 per cent in January (1919) and 36.28 per cent in December (1918).

### Petition to Segregate Lines Denied

Judge Julius M. Mayer of the United States District Court was asked on April 19 to sever the Eighth Avenue Railroad and the Ninth Avenue Railroad from the New York (N. Y.) Railways. The petition was made in behalf of the stockholders of the two surface lines.

Both surface lines are operated by the New York Railways under leases that were negotiated in the early days of the Metropolitan Street Railway, the predecessor of the New York Railways. For the Eighth Avenue Railroad the New York Railways is obligated to pay an annual rental of \$215,000 and all taxes; for the Ninth Avenue line the rental is \$64,000 and taxes.

The petitioners asked the court to direct the receiver to "discontinue the use of your petitioner's said railroads, rights, privileges, franchises and other properties in said indentures or agreement prescribed and to return, surrender and deliver to your petitioners possession of the same." Corporation Counsel Burr had asked the Public Service Commission to take steps to protect the present transfer system.

Judge Mayer on April 21 denied the petition of counsel asking that the lines mentioned be severed from the system of the New York Railways. He made it clear that for the time being it was advisable to keep the system together. He announced that he had instructed the receiver to apply to him for permission to employ experts and accountants in order that the problem might be gone into in a fundamental manner.

### \$20,000,000 Needed in Brooklyn

The Brooklyn (N. Y.) Rapid Transit Company's present resources are not sufficient by \$20,000,000 to bring the service to a state of efficiency, according to Lindley M. Garrison, receiver of the company, in a statement issued on April 18. He placed the responsibility for the deficiency largely at the door of the heavy increase in the workmen's pay. His statement follows in part:

I am glad for all concerned that there was no strike. Now let us all forget it and get together to give Brooklyn the best transportation service in the country. This is not a time for anybody to "rock the boat."

The problem directly concerns everyone, the financiers at large, the men whose money is invested in the road, those who work on the road, the State authorities, the city authorities and the general public.

Our present income is not sufficient to pay our necessary expenses, a large part of which are due to the large wages which the majority of our employees now receive. To this must still be added the amount necessary to bring up to an equitable level the wages of those who did not receive a proportionate raise at the time of the recent increase.

We are terribly hampered by the fact that the city has not completed the lines it is building, and we have not the benefit of what it was intended we should have had long before this.

## Financial News Notes

**Receiver for Small Massachusetts Railway.**—George Spaulding, Canton, Mass., was appointed receiver of the Blue Hill Street Railway, Canton, Mass., on April 9 by Judge Loring of the Supreme Judicial Court of Massachusetts. The action was taken on the petition of the Old Colony Trust Company, trustee, representing holders of \$250,000 of the company's first mortgage bonds.

**Northern Ohio Company Would Issue Bonds.**—The Northern Ohio Traction & Light Company, a subsidiary of the Northern Ohio Electric Corporation, has asked the Public Utilities Commission for authority to issue \$5,995,000 of refunding bonds, of which \$3,000,000 is to bear interest at 4 per cent and the balance at 5 per cent. The company also asks permission to issue \$713,000 of first mortgage 5 per cent bonds.

**Will Pay Deferred Interest.**—F. D. Carpenter, president of the Western Ohio Railway, Lima, Ohio, has sent notices to the holders of the company's first mortgage 5 per cent bonds that interest due on the bonds on Nov. 1, 1918, together with interest at 6 per cent on the deferred payment, will be paid on April 30. The same notice states that the company will not be in funds to pay the interest on these bonds due on May 1. As soon as funds are available, notice will be published and mailed to all known bondholders.

**Scope of Protective Committee Increased.**—The protective committee for the bondholders of the Rhode Island Suburban Railway, Providence, R. I., will serve in similar capacity for the bondholders of the Pawtuxet Valley Electric Street Railway and the Cumberland Street Railway, subsidiaries of the Rhode Island Suburban Railway. Deposits of bonds will be received up to May 15 at the National Exchange Bank, Providence, and the Bankers Trust Company, New York.

**Big Gain in Dallas Over Last March.**—The net earnings of the Dallas (Tex.) Railway for March amounted to \$40,279, an increase of \$20,116 or 99.7 per cent over the corresponding month of last year. Net earnings for March reached the highest point since operation commenced under the new franchise on Oct. 1, 1917. They were equivalent to a return of 6.42 per cent per annum on the property value. For the eighteen months the net earnings have been \$482,699, equivalent to a return of 4.10 per cent per annum as compared to the allowable return of 7 per cent. The comparatively favorable showing for March was due to the increase of gross earnings by \$58,964 or 44.43 per cent to a total of \$191,662.



# Traffic and Transportation

## Six Cents in Atlanta

**After Many Vicissitudes Company There Is Extended a Temporary Helping Hand**

Atlanta's 6-cent fare went into effect on April 14. The Georgia Railway & Power Company in a public announcement asked the citizens of Atlanta to have as near as possible the exact change for their fare as the odd penny would cause no end of confusion if every passenger asked the conductor to change a bill or silver of large denomination.

The 6-cent fare went into effect all over the local territory with the exception of one line to Decatur and the lines to College Park. College Park and Decatur have both been asked by the company to accede to the 6-cent fare voluntarily, because in its recent decision on fares the Supreme Court held that the commission was without jurisdiction over the rates of fare prescribed in the franchise contracts of the company with College Park and Decatur, but that the commission did have jurisdiction over the rates of fare in Atlanta.

### REVIEW OF RECENT HISTORY

It will be recalled that the Superior Court of Fulton County has previously held that a contract fixing fares existed in the case of all three places. The commission had previously recommended an increase in fare for the company, which instituted mandamus proceedings to compel the commission to assume jurisdiction. The county court refused the writ. The Supreme Court then reversed the county court in part. The company then reopened its fare case before the commission. On April 2 the commission prescribed a 6-cent fare. That body explained the basis of its decision in part as follows:

In reaching the conclusion that a 6-cent fare was reasonable and just, the commission made no effort to provide a return on capitalization. The principal elements considered were the value of the service to the public and the cost of rendering it. In determining the last it was necessary to consider the value of the property used in the public service.

No detailed appraisal of property values was attempted because of the character of the application, it being for temporary relief under unusual conditions, and the time necessary for a full appraisal.

The city of Atlanta now asks an appraisal, and offers to bear such portion of the expense as the commission may deem proper. It also asks for an audit of the company's business—both to be made by experts chosen and appointed by the commission.

The commission believes as was stated in its opinion that under normal conditions an appraisal was desirable. It now willingly avails itself of the offer of the city to bear part of the expense.

Our belief is that a long time is necessary and will be consumed in a complete inventory, appraisal and audit. We do not feel under existing conditions that it is just to the company to deny the temporary relief we believe needed, until the appraisal and audit can be completed.

In the order to be issued, prescribing a

6-cent fare, a proviso will be inserted that the increased fare shall not become effective until five days after the company shall have filed with the commission a written agreement to pay as called for by the commission, 60 per cent of the total cost of the appraisal and audit of all its properties and operations, the valuation of properties to be as of April 1, 1919, and the financial operations to be audited for the year 1918 and to April 1, 1919.

After the filing of such an agreement, if the city of Atlanta shall file with the commission an ordinance or agreement by the Mayor and Council to pay 40 per cent of the total cost of the appraisal and audit, as called for by the commission, the commission will, as soon as possible, secure the services of expert engineers and accountants to do the necessary work, under its exclusive supervision and direction.

After the completion of the work and a reasonable time to interested parties for examination and study, the commission will assign a date for formal hearing upon which the commission will open for consideration all the rates of the company, including railway fares, electric light and power, steam and gas rates.

The city further asks that it may be allowed, through such experts as it may see fit, to have appraisals, inventories and audits made as to it may seem proper and submit the same to the commission.

This commission is without authority or power to compel the company to allow an opposing party access to its records and books for such purposes.

The order to be issued will provide that seventeen (17) tickets shall be sold for one dollar (\$1).

## Warning About Cleveland Fares

Fielder Sanders, Street Railway Commissioner of Cleveland, Ohio, on April 15 warned City Councilmen that unless expenditures of the Cleveland Railway are held down fares may have to be raised.

He issued this warning after he drafted a resolution for introduction in Council that will authorize the company to take \$317,394.48 from the interest fund to pay off an over-expenditure of that amount for maintenance in 1918.

The measure, which will be offered in Council, authorizes the company to take \$97,000 from the interest fund in March, and the remaining \$220,000 in eleven months at the rate of \$20,000 every thirty days.

The interest fund is the fare barometer, and when the balance falls below \$300,000 the fare goes up. When the fund reaches \$700,000 the fare is lowered. There is only \$136,000 in the fund, but it is now increasing at the rate of \$100,000 a month.

Commissioner Sanders also warned against making extensions and track renewals that can be dispensed with for the present. The company has asked for \$760,000 this year, of which \$550,000 is for track renewals.

Council will be asked by Commissioner Sanders to take \$250,000 from the amount asked for track renewals, because, he said, rails on four streets can be used several years.

"Continued renewals of track suitable for traffic not only mean a postponement of fare reduction, but may bring a higher charge," said Mr. Sanders.

## Wheeling Fares Readjusted

**Five-Cent Unit Retained, but Number of Zones Has Been Increased Materially**

The Wheeling (W. Va.) Traction Company, operating in Wheeling and between Wheeling and other points in West Virginia and Steubenville, Ohio, has been permitted by the Interstate Commerce Commission to change its passenger tariffs between certain points on its system.

### DECIDE AGAINST ODD FARE

After long study it was decided to continue the "nickel" as a basis of fare between points within any one zone or community rather than to try to meet the conditions by applying an odd fare collection, such as 6 cents or 7 cents, to rides within any one zone or community.

Examination of the plan ordered into effect by the Interstate Commerce Commission shows that the railway has worked out a plan for making certain changes in its present zone limits and has so far as possible taken into consideration the natural loading and unloading points on the entire system so that regular riders between any two points on the system will be inconvenienced to the least possible extent.

The new zones are made as nearly the same distance as conditions make possible and the average length of each zone would be 2.73 miles as against 3.63 under the present zone system, and the average rate per mile would be 1.83 cents as against 1.38 under the present system. The company's entire system has consisted of twenty-four zones whereas under the new system it will consist of thirty-two zones.

With the new plan in effect it will still be possible for residents of Wheeling to ride anywhere within the present corporate limits of that city for 5 cents. Even taking the system as a whole most of the passengers will still continue to ride for a 5-cent fare.

### STATEMENT OF FARES

As an example of the effect of the new zoning system, the following fares will be established: On the line from Wheeling to Bellaire the new fare will be 10 cents as against 5 cents at present. The rate from Wheeling to Martins Ferry will be 10 cents instead of 5 cents. From Wheeling to Steubenville the rate will be 50 cents instead of 40 cents. The rate from Wheeling to Bridgeport will remain at 5 cents. The rate from Moundsville to Bridgeport will be 25 cents instead of 20 cents and the rate from Moundsville to Martins Ferry will be 30 cents instead of 20 cents. These represent some of the principal changes under the new plan.

Included in the company's petition to the Interstate Commerce Commission was a considerable amount of very interesting data showing the general condition of the company's finances at the present time and the very large increase in its operating expenses during the past two years.



## Columbus Settlement Plan

Fare Ordinance Passed Which May Form Basis of Settlement Grant—Proper Service Stressed

A. E. Griffin introduced an ordinance in the City Council of Columbus, Ohio, on the evening of April 14, which may form the basis for a settlement of the fare question. It provides for a rate of six tickets for a quarter for two years on the lines of the Columbus Railway, Power & Light Company, after which the rate will revert back to the present figures of eight for a quarter. Stress is placed upon proper service. On this account control of operation so far as the number of cars and their speed are concerned has been placed with the Council.

### \$500,000 FOR IMPROVEMENT

The ordinance provides that the company shall spend \$500,000 for improvements and extensions during the remaining seven years of the grant, but it will be noted that this is very much less than called for by any of the programs heretofore laid out. In fact, it has been expected that \$1,500,000 would be used for this purpose. The author of the franchise evidently feels that the character of the service is more important than the extensions, although the right is reserved to Council to order limited extensions.

The Griffin ordinance was passed on the evening of April 21 and the long controversy between the city and company may be considered closed for the present. In addition to six tickets for a quarter, the ordinance provides for universal transfers, but leaves the cash fare as it was. Charles L. Kurtz, president of the company, is now in Mexico, but members of Council think that the ordinance will be accepted by the company on his return. The instrument leaves a possibility for a resumption of strife at the end of two years, as the road must revert to the old rate at that time.

The decision of the Supreme Court of the United States with respect to the rights of the company in the matter of fares is reviewed elsewhere in this issue.

## Service Improvements Planned

Modifications of the skip-stop system of operating street cars are being worked out by the Dallas (Tex.) Railway in co-operation with the city administration, to the end that the service may be improved in several respects. Mayor Wozencraft, the new Mayor, has held several conferences with Richard Meriwether, vice-president and general manager of the Dallas Railway, and J. F. Strickland, president.

Plans for the improvement of the service cover the following points:

The placing of additional stops in the downtown district.

Adoption of practical methods for decreasing the time incident to loading cars in the downtown district.

Rearrangement of stops in the residential district.

Stopping of cars in rainy weather on cross streets without sidewalks regardless of skip-stop signs.

Better service for the Mount Auburn and Park View additions, the residents of which have been working for the construction of extensions into their sections.

Mayor Wozencraft gave out the following statement:

The conferences with Messrs. Strickland and Meriwether were very satisfactory. While we cannot go into details as to the various improvements contemplated for the present, they will be worked out as rapidly as possible and put into effect.

As to the plan to decrease the loading time of street cars, I will say that more front-end collectors will be employed to facilitate the loading of cars in the downtown district. This plan is in limited operation here now. We hope to be able to educate the public to the value of rapid loading, as it saves considerable time in the aggregate.

In the rearrangement of stops in the residential district, it is our intention to follow, in so far as it is practical, the method of staggering the stops. This will eliminate the so-called "bunch-stop" plan which is so objectionable at present. By staggering the stops, the street cars will stop, skip a block and stop again on the outbound trip, for instance, and on the inbound trip make stops at every intersection missed on the outgoing trip. Thus no person will have to walk more than one block out of the way than customary to board a street car for the outgoing and incoming trips.

Regardless of the arrangement of the stop signs, during rainy weather all cars will stop at all cross streets where there are no sidewalks parallel to the car line on the same street, or where patrons of the line are forced to wade through mud and slush.

While no plans have been formulated, as yet, for the improvement of the service in Mount Auburn and Park View, we are at work on this question and expect to be in a position to make needed improvements for those sections at an early date.

## 7-Cent Fare Opposed in Jersey

The Public Service Railway, Newark, N. J., has had before the Public Utilities Commission an application for an increase in fare to 7 cents from the 6-cent fare restored by the commission on April 1. Hearings on this application were under way during the week beginning April 20. These are distinct from the hearings on the zoning plan, which are also in progress.

After two adjournments requested by municipalities affected by the proposed fare increase the case was taken up on April 23. On that day Mark Wolff and Dr. Delos F. Wilcox were questioned as to the results of their examination of the company's financial statements, the purpose being to show, on behalf of the municipalities, that the proposed increase is not justified by the reports filed by the company with the commission. The endeavor was made, by means of various assumptions and calculations, to prove that the temporary fare increase which the company had been permitted to make previous to April 1 had produced more than the increase in income estimated by the company.

H. C. Eddy, senior inspector for the commission, was put on the stand by the commission to present an analysis of operating costs of the railway over a term of years. R. E. Danforth, general manager, and M. C. Boylan, auditor of the railway, were also examined as to details of these costs.

As to the zoning plan hearings, these were scheduled for resumption as this issue of this paper goes to press.

## Indianapolis Doing Better

With Return of Peace-Time Conditions Company There Seems to Have Turned the Corner

With the restoration of peace, changes in conditions of travel have resulted in a material increase in the earnings of the Indianapolis Traction & Terminal Company, Indianapolis, Ind. For the months of January, February and March the average increase has been more than \$2,000 a day, or approximately 23 per cent. This is regarded as particularly gratifying considering the very unfavorable conditions under which the company was forced to operate during the war-time period.

### COMPANY'S STRUGGLE REVIEWED

After a decision of the Supreme Court of Indiana on July 30, 1918, ruling that the Public Service Commission had jurisdiction in the matter of the petition for increased fares, the commission on Oct. 12, 1918, granted a straight 5-cent fare, with a charge of 1 cent for each transfer, this 1 cent to be refunded to the passenger when the transfer was used.

In a later order the commission cancelled the charge for transfers. The commission's order further provided for a 50 per cent increase in the wage budget of platform men, which more than absorbed the increase obtained by the company through the granting of the 5-cent fare.

A petition was entered on Dec. 14, requesting the right to charge a 6-cent fare with certain zone charges. This petition was refused by the commission and in its order of Dec. 28, 1918, certain improvements in the service, changes in capitalization, and elimination of the sinking funds were suggested in order to reduce fixed charges.

### BOND INTEREST PASSED

As a result of this order the Indianapolis Traction & Terminal Company on Jan. 1, 1919, did not pay the bond interest on the \$6,000,000 of the Indianapolis Street Railway 4 per cent bonds. A committee of stockholders was accordingly appointed at the annual meeting of the company on April 10 to consider the changes in capitalization and sinking funds, which will be submitted at a further meeting of the stockholders which will be held on May 8.

In compliance with the suggestion of the Public Service Commission, work was started some time ago on the conversion of the standard type of closed car for prepayment fare collection and the majority of the cars have already been converted. The company had contemplated doing this work previously, but the reconstruction had to be suspended on account of conditions brought about by the war.

The situation with respect to the plans being matured for the financial readjustment of the Indianapolis Street Railway is reviewed on page 840 in this issue.



### Kansas City, Kan., Increase Denied

The Public Utilities Commission of Kansas has decided that there is not sufficient cause for raising the fare in Kansas City, Kan., as asked by the Kansas City Railways. The rate will therefore continue at 5 cents.

The commission took the stand that conditions in Kansas City, Kan., are different from those in Kansas City, Mo., where the fare is 6 cents. In Kansas, the decision pointed out, the haul is much shorter than in Missouri, the longest rides in Kansas being only about 5 miles.

The commission also took cognizance of the fact that Kansas passengers are paying 6 cents now when they enter Missouri, the extra penny being collected at the State line.

The company's troubles, the ruling said, appear to be principally from the fact that the same fare is charged regardless of the distance a person rides. It predicted indirectly that some time in the near future the company would have to install a zone system.

The commission retained jurisdiction that it may rule on a zone system or a rate increase in the future if another ruling should seem necessary.

The company, by the decision, loses a fight of more than a year, six months of that time being spent in a court struggle with the city administration of Kansas City, Kan., which brought suit to prevent the State commission from hearing the company's application for a higher fare than that stipulated in its franchise.

### A Labor Man on the Five-Cent Fare

The Bridgeport *Evening Post* of April 4 quoted John J. O'Neill, of the State Labor Union, as follows in regard to the attitude of organized labor with respect to fares of more than 5 cents:

From the standpoint of a workman the charge of any fraction over 5 cents will never be popular. This trolley fare has been discussed in an informal way, time and time again, by members of the trade unions, after the formal meetings. Men will walk rather than ride where the tax is more than 5 cents. From the sentiments expressed, I actually believe that the average man would rather pay 10 cents than 6 or 7. There is something in that extra cent that men rebel against.

The trolley people, in my opinion, made a great mistake when they raised the fare over 5 cents instead of introducing the one-man car. I know this is my actual experience and observation. I was induced to move to the North End of the city where I built a home because it was represented to me that the trolley accommodations were ample. After I got actually settled in my new home the trolley raised its rate to 6 cents, and so, rather than pay the extra cent I walk or take a jitney.

My case is one of a thousand. I could give names of many people living in the North End who do just as I do, and if there are hundreds in my section of the city how many more are there in the other sections of the city?

If the solution of the local problem is the one-man car, the company should install the one-man car all over. In time the one-man car will run the jitney out of business.

My opinion is that the people will patronize the trolley car rather than the jitney. Many jitneys are operated by men who lack consideration for their customers. I have been

in them when I wished that my accident insurance was larger. I don't like smoke, and when another passenger is puffing tobacco smoke in my face I refrain from protesting, as they would call me a crab or a crank, and all that. So if the small trolley cars were in operation, and the fare was down to 5 cents, I am sure that the women of the city would desert the jitney for the trolley. I have no objection to the railway rearranging fares for the longer rides outside of the city and establishing a new system of fare zones, if that is necessary.

### Six Cents in Steubenville

At a special meeting of the Council of Steubenville, Ohio, recently, the proposal agreed upon by the Council for extending a measure of relief to the Steubenville, East Liverpool & Beaver Valley Traction Company, East Liverpool, Ohio, was presented to the company. After a trial of three months the arrangement will be in force for a period of two years. The necessary ordinance which will permit the company to make a uniform charge of 6 cents will be passed by the Council. A fifteen-minute schedule during certain hours on the La Belle View line of the railway company has also been agreed upon.

By way of confirming the understanding, C. L. Williams, city solicitor of Steubenville, has written to the company that the Council has decided to permit the company to charge a 6-cent fare and sell nine tickets for 50 cents; that service shall be increased in accordance with plans previously advanced; that the matter of one-man cars apparently does not come within the limits of the ordinance under which the company operates and must be settled by the company with its employees; that the company must discontinue the skip-stop system of operation, and that the fare increase is only an emergency measure to continue for not more than two years.

### Mr. Lowry Favors a 10-Cent Fare

In an address before the Minnesota section of American Institute of Electrical Engineers at the University of Minnesota, Horace Lowry, president of the Twin City Rapid Transit Company, Minneapolis, Minn., discussing electric railway conditions, put himself on record as follows:

Personally, I am for a straight 10-cent fare, with tickets at the rate of four for a quarter or on some such basis.

We are going to have a lot of trouble with change if we get mixed in this penny business. Few passengers would suffer from a 10-cent fare if we sold tickets cheaper, as I have suggested. Everybody would have a chance to buy tickets which would cost approximately 6 cents each.

Personally I am opposed to charging for transfers. I believe such a system could not help making for discrimination between those who happened to live on a certain car line and those who did not.

Everybody has a kick at the electric railway service at least once a year. It may be our fault in many instances. In many more it is not. Owing to inadequate funds our service during the past winter has been poorer than in former years. A lot of people have said we were trying to force an issue, but we will submit our books to anyone who wants to see. We have offered every concession we possibly could. We have offered to do everything anyone asked us to do. We have only asked for an opportunity to finance the company adequately and to build extensions and improve our service.

### Zone Fares Fixed for Fishkill Electric Railway

The Public Service Commission for the Second District of New York under an order passed on March 28, has authorized the Fishkill Electric Railway operating between Fishkill and Beacon, to charge passengers as follows:

Zone 1, terminal in Fishkill to Mulholland's gate, 1.2 miles, 5 cents.

Zone 2, Mulholland's gate to Glenham switch, 1.1 miles, 5 cents.

Zone 3, Glenham switch to Beacon terminal, 3.7 miles, 6 cents.

Through fares established are: between points in zones 1 and 2, 8 cents; between points in zones 2 and 3, 11 cents; between points in zones 1 and 3, 14 cents.

Commutation fares, fifty-four trip tickets good to purchaser only if used within thirty days, between points in zones 1 and 3, \$5.40; between points in zones 2 and 3, \$4.85.

School tickets, strip tickets, ten coupons each between points in zone 1 and Beacon, 70 cents a strip; between zone 2 and Beacon, 55 cents a strip.

The commission further directs the railroad to maintain the same service between Beacon and Fishkill as given during December, 1918, and to report monthly to the commission a record of passengers carried within each zone and between the different zone divisions with the revenue received.

The commission has denied the company's petition for approval of a declaration of abandonment of its line west of the Glenham switch.

The order of the commission became effective on April 1.

### Interurban Would Penalize City Riders

The petition of the Interstate Public Service Company to increase its rates for passengers within the city limits of Indianapolis from 5 cents to 10 cents has been continued for two weeks by Commissioner Charles A. Edwards. Robert G. Gordon, attorney for the interurban company, said that the increase was asked because it would tend to keep local passengers off the interurban cars. This, of course, is one of the things that the interurban company desired.

Merle N. A. Walker, appearing for the property owners in the southwestern part of the city, suggested that the commission grant the increase on condition that an agreement be made with the Indianapolis Traction & Terminal Company for the leasing of the interurban railroad tracks within the city limits for a nominal rental and for the city company to provide city service on this line.

Samuel Ashby, Corporation Counsel of the city, opposed this suggestion. He said that the city could not compromise itself by agreeing to permit one interurban to increase its city fare 100 per cent and not permit all other interurban electric railways that operate into the city to make similar increases.



## Transportation News Notes

**One-Man Cars in Kansas City.**—One-man cars were placed in operation on the Sunset Hill Line by the Kansas City (Mo.) Railway on April 20.

**Recommends Return to Five-Cent Fare.**—The City Council of Ottumwa, Ia., has passed an ordinance recommending the return to the 5-cent fare on the lines of the Ottumwa Railway & Light Company, the 6-cent fare having been allowed on Dec. 23.

**Five-Cent Fare Restored.**—Five-cent fares were restored in Battle Creek, Mich., on April 22 as the result of action taken by the City Commission on April 21, voting to rescind the 6-cent fare resolution passed in favor of the Michigan Railway nearly ten months ago.

**Seven-Cent Zones Authorized.**—The Tyler Traction Company, operating between Sistersville and Middlebourne, W. Va., has been allowed by the Public Service Commission to increase its passenger rates from 5 cents to 7 cents for each of the six zones, making the new fare between the towns 42 cents. Half-fare rates are to be allowed for students.

**Six Cents in East St. Louis.**—The East St. Louis (Ill.) Railway has been granted permission by the Public Utilities Commission of Illinois to continue until July 3, the increase in adults' single cash fare to 6 cents each and those of children to 3 cents each. Transfers are to be free, but may be so restricted as not to permit a round trip for one fare. The company had asked for an increase to 7 cents for adults.

**Amended Petition at Lincoln.**—An increase in fares and the establishment of three zones is asked by the Lincoln (Neb.) Traction Company in an amended petition filed with the State Railway Commission of Nebraska. Under the tariff now proposed the company would charge 9 cents a trip between Lincoln and Havelock and 7 cents between Lincoln and other surrounding towns.

**Arranging for Fare Increase.**—The Yonkers (N. Y.) Railroad has postponed for a few days putting into effect the fare increase recently allowed by the Board of Aldermen. Certain changes in operation in connection with the fare advance must be made. As noted in the *ELECTRIC RAILWAY JOURNAL* for March 29, the Aldermen on March 22 voted to permit the Yonkers Railroad to charge an extra 5-cent fare beyond the city limits.

**Six-Cent Fares in British Columbia.**—The advent of the 6-cent fare on the lines of the British Columbia Electric Railway, Vancouver, B. C., has compli-

cated somewhat the fare-collection system used there. In conformity with Canadian custom, the company has used a fare box which could be carried through the car and which took the small Canadian 5-cent coins and tickets. Under the present system tickets are sold, and only tickets are put in the fare box.

**Resumption of New York State Hearings.**—The Public Service Commission for the Second District of New York has set April 30 as the probable date for the resumption of the hearing on the financial condition of the New York State Railways. At this hearing Benjamin B. Cunningham, corporation counsel of Rochester, N. Y., will cross-examine upon the figures recently submitted by an expert employed by the railway to make a physical valuation of its properties.

**Jitney Regulated in Bloomfield.**—By a vote of six to one the Town Council of Bloomfield, N. J., on April 21 passed on final reading a jitney ordinance which provides for payment of a yearly license fee of \$100, filing of a liability insurance bond in the sum of \$5,000, and appointment of an inspector by the officials. Because the Council refused to agree not to issue more than sixty licenses, jitney service was withdrawn on the Newark-Bloomfield route several weeks ago.

**Vehicle Turns in Vancouver.**—The city of Vancouver, B. C., is considering a change from the rule of passing to the left, which has been followed for many years, in favor of the turn to the right, as in the United States. If the city makes this change, the local company, the British Columbia Electric Railway, will have to change its car platforms and cross-overs. The proportion of this expense to be paid by the city and the province will probably have to be settled by legislative enactment at the next session.

**Increase in Train Service.**—The Monongahela Valley Traction Company, Fairmont, W. Va., has put on two trains between Clarksburg and Fairmont. The trains are composed of four of the new interurban cars—two to each train. In addition the third train is composed of the old-type interurban cars. The company will, in the near future, place more new equipment in use. Four additional new interurban cars have arrived from the manufacturer and just as soon as they can be fitted out, two of these cars will be utilized to form the third train between Fairmont and Clarksburg.

**Protest Against Indiscriminate Use of Word "Subway."**—Frank Hedley, general manager of the Interborough Rapid Transit Company, New York, N. Y., objects to the Brooklyn Rapid Transit Company using the word "subway" in connection with its underground line in Manhattan. Mr. Hedley told members of the Public Service Commission recently that he believes the Interborough is the only company entitled to call its underground line a

subway. The acting chairman of the commission suggested it might be wise for both the companies to eliminate the use of the word "Broadway." The commission decided to defer action.

**Paying Increase in Fare Voluntarily.**—At the present time the New York & North Shore Traction Company, Roslyn, N. Y., is averaging about 400 voluntary 7-cent fares daily. When the voluntary movement was at its height, the company received around 800 7-cent fares daily. The railway carries between 3000 and 4000 people inside the city limits of Greater New York daily, so that the percentage paying a 7-cent fare is small. The interests not identified with the company who fostered the voluntary increased fare plan hope to be able to revive the voluntary movement soon. The New York City administration still turns a deaf ear to the plea of the company for permission to exact an increase in fare from its patrons.

**No Free Rides Upheld.**—Supporting the principle laid down by Thomas F. Murphine, Superintendent of Public Utilities of Seattle, Wash., and head of the railway system recently acquired by the city, that no person shall be allowed to ride on the municipal lines without paying the usual 5-cent fare, the public safety committee of the Council recently approved the ordinance appropriating money from the general fund to the car fare of members of the Police and Fire Departments when obliged to ride on the cars in performance of their duties. The ordinance provides for an appropriation of \$20,000, or so much of that sum as may be necessary. Other city departments have always provided for this expense, appropriations running from \$50 to \$500 a year. Carfare will be provided only for transportation on duty, and does not include rides to and from homes. The protests against making everybody pay were referred to in last week's issue.

**Commission Upholds Increase.**—The Public Service Commission of Pennsylvania in an opinion rendered by Commissioner John S. Rilling has dismissed complaints filed against the rates of fare of the Bangor & Portland Traction Company, Bangor, Pa., but directing that the company file a detailed statement of its receipts and operating costs for the year ending Jan. 1, 1920, furnishing a copy also to counsel for the complainants who may have the right to renew the complaint. The evidence, says the commissioner, indicates that the increase in fares and zones will not produce more revenue than the company has a right to collect. Its territory is limited and the commissioner holds that "what was a fair rate for an electric railway became inadequate by reason of increased prices brought about through war conditions," and, therefore, "the public must expect to pay increased rates for the services it accepts from a utility in like manner as it pays increased prices for other needs."



## Personal Mention

### Changes in Puget Sound Personnel

A. W. Leonard, president of the Puget Sound Traction, Light & Power Company, Seattle, Wash., has announced a partial reorganization of the personnel of the company, with the statement that complete reorganization will be effected about May 1. The changes effective immediately are as follows:

The position of manager of auxiliary operations is created, and the position of assistant to the president abolished. W. J. Grambs, who has held the abolished position, becomes manager of auxiliary operations, and under the new plan will report to W. H. McGrath, vice-president. The auxiliary operations department will include the following subsidiary companies: Diamond Ice Company, Renton Coal Company and Washington Auto Bus Company.

The position of chief electrical engineer is created. G. E. Quinan has been promoted to this position. Mr. Quinan has been electrical engineer for the Seattle division. That position will now be filled by S. C. Lindsay, formerly assistant engineer of the Seattle division.

Following the resignation of General Manager G. A. Richardson, H. R. Leigh, Jr., has been appointed superintendent of the Washington Auto Bus Company. Until the reorganization of the Seattle division of the Puget Sound Traction, Light & Power Company is completed, all heads of departments will report direct to Vice-President McGrath.

Richard McCulloch, president, has been retained as operating head of the United Railways, St. Louis, Mo., by Rolla Wells, the receiver.

Philip Dawson, M.Inst.C.E., M.I. Mech.E., M.I.E.E., has been created by Albert, the King of the Belgians, "Chevalier de l'Ordre de Leopold," in recognition of his services as a member of the Belgian Royal Commission on the electrification of the Belgian State Railways.

L. E. Stibbe, formerly editorial representative of this paper, first in New York and later in Chicago, has joined the advertising department of the General Electric Company. During the war Mr. Stibbe served overseas with the Engineers' Corps with the rank of sergeant.

Allen C. Davison, who before the war was on the editorial staff of this paper, has become managing editor of *Let's Go*, a military publication, which "emanates weakly" from Hill 772, Verneuil, France. Mr. Davison is corporal of the Motor Transport Reconstruction Corps, of which *Let's Go* is the official organ.

H. J. A. Gerard, who has been chief engineer of the Alton, Granite & St. Louis Traction Company, now is in charge of the power house of the East St. Louis Light & Power Company at Alton and the line and meter distribution departments of the Alton Gas & Electric Company and the Hartford, Piasa & Granite City substations of the Alton, Granite & St. Louis Traction Company.

### A. L. Kempster in New York

A. L. Kempster has been called to aid in the present study of the New York Railways and Brooklyn Rapid Transit lines under the receivers of these properties.

Mr. Kempster was manager of the Seattle division of the Puget Sound Traction, Light & Power Company be-



A. L. KEMPSTER

fore the system was acquired by the city of Seattle. Mr. Kempster will first assist Frederick P. Royce, general manager for the receiver of the Brooklyn Rapid Transit Company, and will then give his time to the receiver of the New York Railways.

Mr. Kempster entered the employ of the consolidated street railways of Seattle, Wash., as an office boy on Nov. 10, 1891. He went from that place to the position of accountant, then became auditor and secretary of the consolidated properties in the city of Seattle, both being progressive steps in his advancement. When the Seattle Electric Company was organized, in 1899, he entered the operating department as trainmaster of the system. Later he became superintendent of transportation, then general superintendent and finally manager of the Seattle division of the Puget Sound Traction, Light & Power Company.

The study that is now being made of all the lines in the borough of Manhattan under the receiver is being car-

ried on by Stone & Webster, engineers, and Price, Waterhouse & Company, accountants.

C. W. Kellogg, of Stone & Webster, is in charge of the study of the Manhattan lines. Soon after Mr. Royce went to the Brooklyn Rapid Transit Company he called G. A. Richardson to assist him. Mr. Richardson was superintendent of the Seattle division of the Puget Sound Traction, Light & Power Company, of which Mr. Kempster had been manager, in Seattle. Mr. Richardson was with Mr. Royce for a few weeks and then went to Philadelphia, where he is now superintendent of transportation of the Philadelphia Rapid Transit lines.

## Obituary

George E. Clafin, a vice-president of the Electric Bond & Share Company, New York, N. Y., died suddenly on April 18 at Atlantic City, where he had gone for the Easter holidays. Mr. Clafin was born in Providence, R. I., in 1866, and was graduated from the Massachusetts Institute of Technology in 1888. He was connected with some of the earliest electric power and electric railway installations in the country. He was later a member of the firm of Lewis & Clafin, consulting engineers, Providence, R. I. In 1904 he became associated with the United Electric Securities Company, Boston, and in 1913 he was elected a vice-president of the Electric Bond & Share Company.

Samuel E. Smith, formerly general manager of the Reading Transit & Light Company, Reading, Pa., died of a complication of diseases on March 24 in Reading. It was while filling a position in Mobile, Ala., that Mr. Smith was taken ill. In the hope of regaining his health he returned to Reading to live with his parents. Mr. Smith was born in Womelsdorf, Pa., in 1877. He resided in Reading nearly all his life. He attended the schools in Womelsdorf and was graduated from the Interstate Commercial College in Reading. Early last November, 1918, Mr. Smith was appointed general manager of the Mobile Light & Railroad Company, Mobile, Ala. On Nov. 23, he was taken ill at Mobile and soon returned to Reading. Mr. Smith began his career with the Reading Transit & Light Company more than ten years ago as purchasing agent and soon was advanced to claim agent. With rapid promotion he passed to the superintendent's office, which he filled for a brief time, and then became general manager. Mr. Smith at one time was purchasing agent for the Trenton Brick Company. After several years with this firm he joined the Montello Brick Company's force, where he remained until the concern went into bankruptcy. It was after this that Mr. Smith entered the employ of the Reading Transit & Light Company.



# Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER,

SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES

BUSINESS ANNOUNCEMENTS

## Rail Bond Purchasing Slow

**Little Track Work Being Done—Operators Waiting for Readjustment of Conditions**

It is apparent that very little track work is being done so far this year, for the manufacturers of rail bonds report that the buying of this equipment is hardly up to the normal purchases of the past two years. The building of track for the last few years has, of course, been considerably below the normal of former years. The figures compiled by the **ELECTRIC RAILWAY JOURNAL** and published in the issue of Jan. 4, show that, exclusive of the additions to new rapid transit lines in New York City, there were 233 miles of new track built and 130 miles rebuilt during the past year. This represents an increase in mileage of less than one-half of 1 per cent and shows that only about one-quarter of 1 per cent of the total mileage was rebuilt.

### READJUSTMENT TO STIMULATE BUYING

There has been a steady decrease in the amount of track extensions for the past five years, or since the beginning of the war, and the present conditions indicate that the signing of the armistice has had no material effect upon electric railway work. New work can hardly be undertaken extensively until the signing of peace and a complete readjustment of conditions, which will give the railway operators the funds which they have sorely needed for several years. At present, the roads are holding out for price reductions although they fully realize that the immediate possibility of such is remote. When the readjustment comes there will be buying and work a plenty, for much track has been allowed to decline to an extent the necessity for which is to be regretted.

Due to the lack of buying by the electric railways the manufacturers of rail bonds are carrying very little stock on hand. Six months ago the demand of the mining industry for rail bonds exceeded that of the electric railways. The program of the Fuel Administration was such that the electrification of coal mines became essential and the buying of rail bonds for this purpose made up for the lack of construction in the railway field and necessitated that the manufacturers carry some supplies on hand. Some of the mines are now shut down entirely, the majority of the others are operating only 50 per cent time and those needing bonds are supplied well ahead. While one manufacturer can promise deliveries inside of ten days, others state that practically

any type and quantity can be furnished in three weeks.

About March 1, the discount on rail bonds was increased from 20 to 25 per cent. No change in prices has taken place since that time, but as the copper market is uncertain, a fluctuation in the price of this staple may bring a further revision in the cost of the rail bonds at any time.

## Wheel Market Marking Time

**Steel Wheel Buyers Apparently Waiting for Cut in Price—Manufacturers Anticipate No Change**

The market for steel car wheels seems to be widely affected by the belief that prices will soon take a tumble. Why this belief should have taken such deep root is not readily explainable, for it would seem very apparent that the cost to the manufacturer is just as great now as it was before the armistice was signed. It is true that the price of steel has dropped and that there is plenty of raw material to be obtained, but the cost of the raw material amounts to a very small part of the cost of the finished product. From the ore field to the finished car wheel the item of labor probably amounts to 85 per cent of the total cost. There is no indication that the cost of labor will be reduced very soon.

Considerable interest is being shown in so far as inquiries are concerned, but buying continues hardly normal just at present. A large per cent of the purchases are repeat orders.

Due to the light demand, manufacturers of steel wheels are carrying little stock and this is confined to the standard A. E. R. E. A. 33-in. wheel. Deliveries on this wheel can be made in from three weeks to thirty days and on other special types in from forty to sixty days. Prices still remain the same although one manufacturer indicates that there might be a slight drop in the next month. This would be due to the fact that it is realized wages and high cost of materials must gradually come down together. Some manufacturers feel that they should take the first step down and that labor will then feel safe to follow.

Conditions of steel wheel buying are practically the same in the steam railroad field as in that of the electric railways, although the former business of course constitutes a considerably larger percentage of the total. The manufacturers look forward very optimistically, however, to the increased buying which they expect from the electric railways as soon as these companies can obtain sufficient capital to finance purchases.

## Fender Market Active

**Favorable Export Demand With Domestic Sales Largely for Rolling Stock Now in Operation**

Current sales of car fenders and life guards are found by one of the prominent producers to be in a very satisfactory condition. Of course, there is not the market that there was five years ago, owing to the greatly decreased number of new cars being built. There is, however, the regular maintenance market to take care of accidents which wreck fenders and a certain market for equipments for new cars. In addition there is the market for replacement. Some of this is caused by the wearing out of the old equipment, but not a small part is due to the replacement of existing equipments by others which appear to be better adapted to traffic conditions.

Inquiries in the domestic market are caused largely by local regulations requiring the installation of life protection devices. Where such are not required road managers are not so apt to purchase these devices on their own initiative, owing primarily to their belief in the safety to the public of their own road. In such places the manufacturers are making efforts to interest the operators in protective devices.

In addition to the domestic market activity is growing in the export field. Inquiries are coming in for American equipments and favorable business is coming out of them. Such protective devices, it is stated, are being applied to the rolling stock in virtually every civilized country.

## Some Track Equipment Shows Life

**Activity Reported in Domestic and Foreign Fields for Rail Joints—Bond Testers Normal**

It is gratifying to note that there is a favorable market in a few articles of track supplies and maintenance. This is borne out in the increased activity shown in the inquiries received for rail joints and the number of orders resulting from these inquiries.

It is not only in the States that these orders have originated but many also have come from foreign fields. This export trade is the particularly bright spot in the market. Canada stands out especially in this respect, and the South American countries are also a satisfactory outlet for this material.

The market for rail bond testers has been found normal.



## War Cost of Electric Railway Equipment

For the information of the Liquidation Commission, the office of the Chief of Engineers has prepared an estimate of the costs of railroad equipment

UNIT COST OF STANDARD GAGE RAILWAY EQUIPMENT COMPARED WITH PRE-WAR COST

	Shipped to A. E. F.	Unit Price Pre-War	Actual Cost	Actual Cost in Per Cent of Pre-War Cost
Locomotives:				
Consolidation.....	1,306	\$17,500	\$42,966	245
Gasoline.....	10	9,350	22,000	235
Saddle tank.....	30	4,500	9,700	216
Total.....	1,346			
Cars:				
Tank.....	675	1,367	3,397	248
Gondola, l. s.....	3,429	1,090	2,340	215
Flat.....	1,900	982	2,107	215
Box.....	7,299	1,290	2,755	214
Refrigerator.....	950	1,649	3,489	212
Gondola, h. s.....	2,650	1,155	2,430	210
Dump.....	500	1,026	2,108	206
Ballast.....	400	1,454	2,987	205
Box, with cab.....	500	1,366	2,770	203
Total.....	18,303			

COST OF STANDARD GAGE RAILWAY EQUIPMENT COMPARED WITH PRE-WAR COST

	Pre-War Cost	Actual Cost	Actual Cost in Per Cent of Pre-War Cost
Locomotives.....	\$23,083,500	\$56,624,870	245
Cars.....	22,346,745	48,822,100	214
Total.....	\$45,430,245	\$104,446,970	230

shipped to the A. E. F. computed on the basis of 1914 prices. The government actually paid from two to two and a half times the pre-war costs, as shown by the table.

## New Firm of Advisory and Purchasing Engineers

Wheeler, Mechlin & Rhea have formed a firm of advisory and purchasing engineers with headquarters in the West Street Building, New York City. It has been organized to furnish service to foreign and domestic clients purchasing machinery and engineering materials in the United States, and also to construct, maintain and operate properties. Among the products which the company is prepared to purchase are general construction materials and plant, electric railway materials, equipment and supplies and electric light and power apparatus and supplies.

The service to be rendered includes overseeing of shipments, inspection of bills of lading and goods, and forwarding.

The personnel comprises Earl Wheeler, formerly treasurer and general manager of the Electric Speedometer Company and local manager of the General Electric Company, Washington, D. C., and Lieut. Colonel of Engineers, U. S. A.; O. A. Mechlin, formerly of Mechlin and Starr, architectural engineers, Washington, D. C., Lieut. Commander, civil engineering corps, U. S. N.; Frank Rhea, formerly supervisor of track of the Norfolk and Western Railway, division engineer of the Pennsylvania system, and com-

mercial engineer of the railway engineering department of the General Electric Company.

## Franchises

**Montgomery, Ala.**—The Montgomery Light & Traction Company has asked the City Commissioners of Montgomery for permission to construct a 1-mile extension to Wright Field.

**Miami, Fla.**—The Miami Beach Electric Company has received a franchise from the City Council to construct an electric line at Miami Beach. Carl G. Fisher, president.

## Recent Incorporations

**Selma (Ala.) Electric Company.**—Articles of incorporation have been filed by the Selma Electric Company to own, operate and conduct a general traction business in the city of Selma and vicinity. It is understood that the new company is formed for the purpose of protecting the interests of the largest stockholders in the Selma Traction Company, which will be sold at auction in May. Incorporators: Charlotte L. Waters, Gertrude E. Abbott, D. L. Gerould and Hugh Mallory. D. L. Gerould, Warren, Pa., is named as president and Hugh Mallory as secretary-treasurer and general manager.

**Carolina & Georgia Railway, Asheville, N. C.**—Incorporated to construct a line from Andrews to Hayesville, about 25 miles. Officers: John C. Arbogast, president and general manager; S. F. Chapman, secretary and treasurer, and L. Chapman, vice-president, all of Asheville, N. C.

## Track and Roadway

**St. Petersburg, Fla.**—It is reported that plans are being considered by W. D. McAdoo, St. Petersburg Beach, for the construction of an electric railway from Davisti to Pass-a-Grille, about 7 miles.

**Quincy (Ill.) Railway.**—Work will be begun soon by the Quincy Railway on the complete rehabilitation of its system. A large number of new switches and crossings will also be installed.

**Iowa Railway & Light Company, Cedar Rapids, Iowa.**—It is reported that the Iowa Railway & Light Company has under consideration the construction of an extension to the Old Soldiers' Home.

**United Railways & Electric Company, Baltimore, Md.**—Arrangements are being made by the United Railways & Electric Company for the erection of a new two-story reinforced concrete signal tower to be located at its properties at Sparrows Point.

**Trenton & Mercer County Traction Corporation, Trenton, N. J.**—Permission has been granted the Trenton & Mercer County Traction Corporation by the City Commission to place all its

heavy transmission lines in conduits which now run overhead along Lincoln Avenue from the power station. When the work is finished the many trolley poles will be removed.

**Interborough Rapid Transit Company, New York, N. Y.**—The Public Service Commission for the First District of New York has awarded to Terry & Tench, New York, N. Y., at \$586,700, the contract for the construction of the Westchester Avenue elevated extension of the Pelham Bay Park branch of the Lexington Avenue Subway. Construction is to begin shortly, upon the approval being obtained of the Board of Estimate and Apportionment. Arrangements have been made by the Commission that in so far as possible the track laying and station finish work shall be constructed simultaneously with the general construction work, so that the line can be completed and placed in operation bit by bit east of the present terminus of operation, namely Hunts Point Avenue. The Commission has reason to believe that the general construction will be completed as far as the terminus of the elevated portion, namely, Pelham Bay Park, by the end of the year, and that a considerable additional portion of the line will be in operation by that time.

**Durham (N. C.) Traction Company.**—A report from the Durham Traction Company states that it plans to reconstruct 1½ miles of track.

**Cleveland (Ohio) Railway.**—Work has been begun by the Cleveland Railway on the construction of a new cross-town line on East Thirtieth Street from St. Clair Avenue to Pittsburgh Avenue, a distance of 2 miles. The cost of construction will be about \$250,000.

**Oklahoma (Okla.) Railway.**—An interurban line from Tulsa to Oklahoma City is being promoted by John Shartel, vice-president and general manager of the Oklahoma Railway.

**Tulsa (Okla.) Street Railway.**—An extension will be built by the Tulsa Street Railway on Pearl Street.

**Berlin & Northern Railway, Kitchener, Ont.**—The Berlin & Northern Railway has asked the Ontario Legislature for permission to change its name to the Waterloo-Wellington Railway and to extend the time in which to construct an extension from Bridgeport to Elora and Fergus.

**Peterborough (Ont.) Radial Railway.**—It is reported that the Peterborough Radial Railway has under consideration the construction of an extension on Park Street from Albert Street to Lansdowne Street and an extension from Peterborough to the summer resorts on the Kawartha Lakes.

**Buffalo & Lake Erie Traction Company, Erie, Pa.**—Work has been begun by the Buffalo & Lake Erie Traction Company on the construction of an extension up State Street to Twenty-sixth Street and on Twenty-sixth Street to American Avenue. Further improvements are also planned.



**South Carolina Light, Power & Railways Company, Spartanburg, S. C.**—The City Council has awarded the South Carolina Light, Power & Railways Company a contract for lighting the city for a period of ten years. Under the terms of the new contract the company will install an ornamental lighting system in the business district.

**Puget Sound Traction, Light & Power Company, Seattle, Wash.**—Alterations will be made at once to the waiting station of the Puget Sound Traction, Light & Power Company at 601 Olive Street, estimated to cost \$5,000.

### Power Houses, Shops and Buildings

**British Columbia Electric Railway, Vancouver, B. C.**—Plans are being made by the British Columbia Electric Railway for the construction of a station at Langley Prairie.

**Pacific Electric Railway, Los Angeles, Cal.**—A new passenger and freight station will be built by the Pacific Electric Railway at Harbor City.

**Georgia Railway & Power Company, Atlanta, Ga.**—The sixth turbine and generator at the Tallulah station of the Georgia Railway & Power Company will soon be placed in service. The work has been in progress about one year and will cost about \$500,000.

**Washington, Baltimore & Annapolis Electric Railroad, Baltimore, Md.**—Terminal improvements to cost \$1,250,000 will be made this year by the Washington, Baltimore & Annapolis Electric Railway, \$750,000 of this being for a large combined freight and passenger terminal at the corner of Howard and Lombard Streets, Baltimore, and \$500,000 for a new passenger terminal to be erected on New York Avenue between Eleventh and Twelfth Streets, Washington. The contract for the Washington terminal will be let this summer.

**Philadelphia, Pa.**—Sealed proposals will be received by William S. Twining, director of the Department of City Transit of Philadelphia until April 29 for the following work appurtenant to the Frankford Elevated Railway: Contract No. 551—Erection of brick, steel and reinforced concrete station buildings at the northeast and southwest corners of Kensington and Allegheny Avenues, including the removal of existing buildings on these sites, and Contract No. 552—Erection of brick, steel and reinforced concrete station buildings at the southwest and southeast corners of Kensington Avenue and Somerset Street, including the removal of existing buildings from these sites. Copies of plans and specifications may be had upon deposit of \$10 for each set of plans, which will be refunded upon return of plans.

**Texas Power & Light Company, Dallas, Tex.**—The Texas Power & Light Company, which furnishes energy to the Texas Electric Railway, contemplates the construction of an addition to its plant at Waco to cost about \$200,000.

### Trade Notes

**Reciprocating Electric Tool Company, Louisville, Ky.**, has increased its capital from \$10,000 to \$100,000.

**Mitchell-Rand Manufacturing Company, 99 John Street, New York City**, has removed to larger quarters at 18 Vesey Street.

**J. H. Deppeler of the Metal & Thermit Corporation** was on April 11 elected a director of the American Welding Society.

**Independent Lamp & Wire Company, York, Pa.**, manufacturer of wire products, will build a one-story addition at a cost of \$6,500.

**Page Steel & Wire Company**, with its main plant at Monessen, Pa., has put all departments on an eight-hour day basis in order that more men may be employed.

**Power Specialty Company, Dansville, N. Y.**, manufacturer of Foster superheaters, is arranging for the manufacture of a new fuel-saving device now being developed.

**B. H. Ahlers**, formerly sales manager of the circuit breaker division of the Condit Electrical Manufacturing Company, has since March 1 taken up sales work with the insulated-wire division of the Marlin-Rockwell Corporation, New Haven, Conn.

**C. E. Hague**, formerly production engineer of the Mid-West Engine Company, Indianapolis, Ind., has been appointed sales manager of the American Steam Conveyor Corporation, Chicago, manufacturer of steam ash conveyors and other ash-handling equipment.

**Chicago Insulated Wire & Manufacturing Company, Sycamore, Ill.**, suffered loss by fire in the neighborhood of \$150,000. Several buildings and some stock were damaged. The plant was one of the largest in the Central West for the manufacture of insulated copper wire.

**Van Dorn Electric Tool Company, Cleveland, Ohio**, will soon erect a four-story addition to its plant. The new plant, like the present factory, will be devoted entirely to the making of portable electric drills and grinders. All parts of the specially designed motors are made in the plant.

**A. P. Green Fire Brick Company, of Mexico, Mo.**, has opened an Eastern district sales office in New York City at 30 Church Street. Howard C. Thayer, formerly field mechanical engineer for the J. G. White Engineering Corporation at the United States nitrate plant No. 2, is in charge.

**Metal Statistics for 1919.**—The American Metal Market and Daily Iron and Steel Report, New York, has issued its twelfth annual edition of "Metal Statistics." The preface states that "there is now so much interest in what occurs during and after wars that attention may be directed to the long span of some of these tables."

**Chicago (Ill.) Pneumatic Tool Company** announces the discontinuance of its offices at Wichita, Kan. F. V. Sargent has been appointed district manager of sales in the Boston territory, succeeding F. S. Eggleston with headquarters at 182 High Street Boston. The company also announces the removal of its Milwaukee office from Room 1305 Majestic Building to Room 1418 in the same building, where more convenient quarters necessitated by the growing business of the company in that district have been obtained.

**Standard Refractories Company, Claysburg, Pa.**, manufacturer of silica brick, and other refractories, recently issued \$500,000 ten-year 6 per cent first mortgage bonds for the purpose of refunding a small bond issue now outstanding, also for permanently funding additions made to the plant during the war period, to purchase a ganister property which the company is now operating and to add to the plant a complete machine shop and warehouse. It is not the intention of proceeding at once, however, with the building of the new machine shop and warehouse, but this will likely be done later this year.

**Holden & White, Inc., Chicago**, report a constantly increasing sale of Perry-Hartman side and center bearings. As indicative of the activity among railways in purchases of these lines, recently orders for these bearings have been received from the following railways: Chambersburg, Greencastle & Waynesboro Street Railway; West Helena Consolidated Railway; Lehigh Valley Transit Company; Eastern Texas Traction Company; Southern Cambria Railway; Evanston Railway; Easton Transit Company; Douglas Traction & Light Company; Lynchburg Traction & Light Company; Harrisburg Railways; Orange County Traction Company; Conestoga Traction Company; Oakland, Antioch & Eastern Railway; Eastern Pennsylvania Railways; Burlington County Transit Company. It is stated that these bearings have been purchased largely because of the reduction in flange and wheel wear which they effect.

### New Advertising Literature

**Corliss Carbon Company, Bradford, Pa.**: Bulletin No. 6 giving data on motor and generator brushes.

**Condit Electrical Manufacturing Company, South Boston, Mass.**: Bulletin No. 440, describing type N-2 fused oil switches.

**International Steel Tie Company, Cleveland, Ohio**: A folder on "Crossing Frog Costs," attaching a blue print inquiry sheet for quotations.

**Schweitzer & Conrad, Inc., Chicago, Ill.**: Catalog entitled "High Voltage Protective and Switching Equipment," divided into five sections covering fuses and switches, circuit breakers, cutouts, lightning arresters and relays.



# Peacock Brakes from Coast to Coast



## The "Hilliest town on the map" uses Peacocks

Practically every car operating in Kansas City is equipped with Peacock brakes.

That's because the Peacock substitutes a *gradual* yet powerful braking action for the *locked-and-skidding-wheels* that spell disaster on grades like Kansas City's.

If no other "hilly" town in the country but Kansas City used Peacock Brakes, their service in that city alone would stamp them as the brakes to have faith in when it comes to a pinch. But Kansas City is only one of scores of steep-grade cities, whose cars are Peacock-protected.



*Next Stop*—ST. LOUIS

**National Brake Co.**  
Buffalo, N. Y.



# Bankers *and* Engineers

## Ford, Bacon & Davis, Engineers.

115 BROADWAY

New Orleans

NEW YORK

San Francisco

## THE J. G. WHITE COMPANIES

ENGINEERS  
FINANCIERSCONTRACTORS  
OPERATORS43 EXCHANGE PLACE . . NEW YORK  
LONDON CHICAGO

## STONE & WEBSTER

Industrial Plants and Buildings, Steam Power Stations, Water  
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52 VANDERBILT AVE., NEW YORK

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REPORTS, DESIGNS, CONSTRUCTION, MANAGEMENT  
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Trinity Bldg. No. 208 So. La Salle St., WashingtonPurchase, Finance, Construct and Operate Electric Light  
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Examination and reports Utility Securities Bought and SoldTHE MOST SUCCESSFUL MEN IN THE  
ELECTRIC RAILWAY INDUSTRY READ THE  
ELECTRIC RAILWAY JOURNAL  
EVERY WEEK

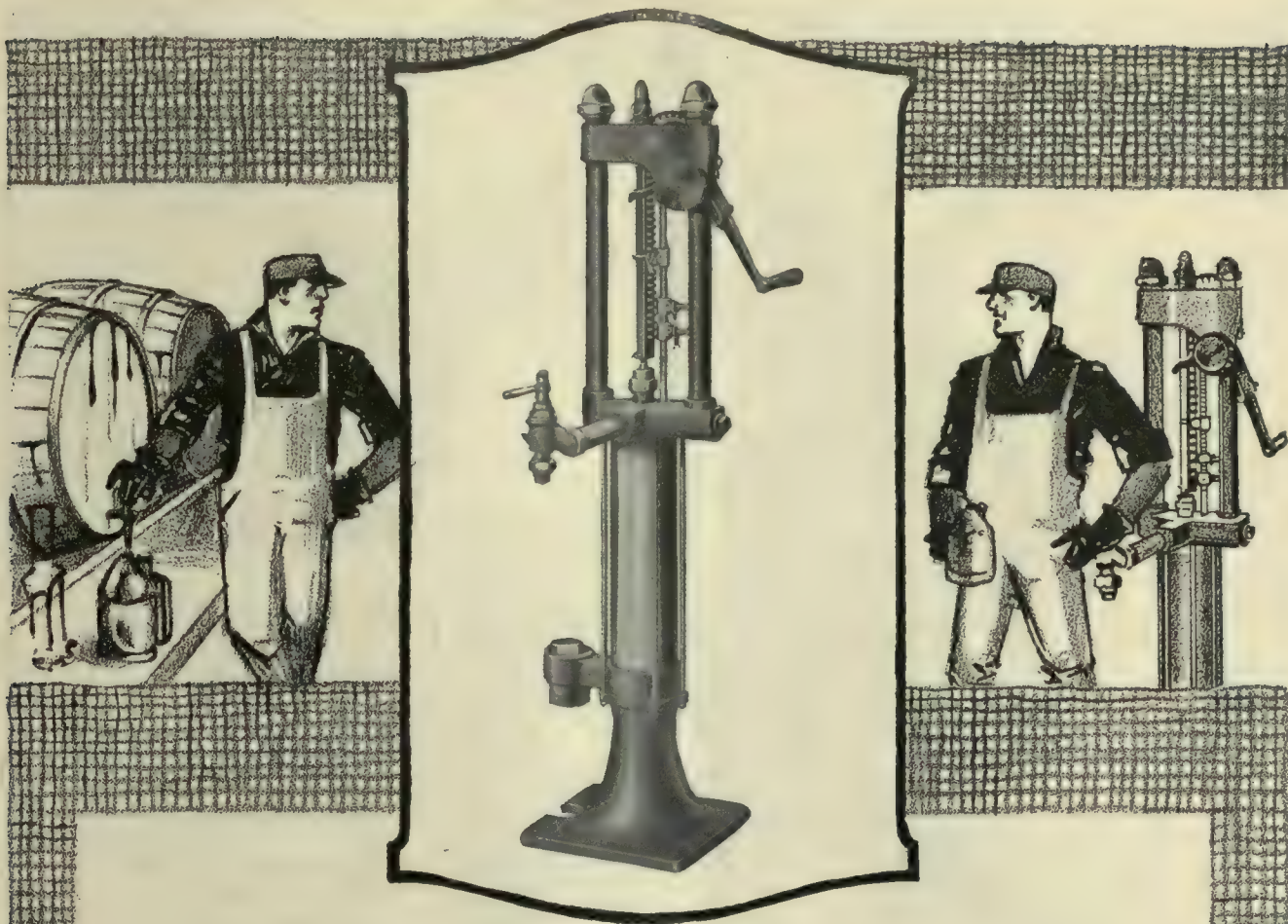
## THE P. EDW. WISH SERVICE, Inc.

Suite 1710 DETECTIVES Suite 715  
Park Row Bldg., New York Board of Trade Bldg., BostonWhen writing the advertiser for information or  
prices, a mention of the Electric Railway  
Journal would be appreciated.ELECTRICAL TESTING LABORATORIES  
Electrical, Photometrical and  
Mechanical Testing.

80th Street and East End Ave., New York, N. Y.

Scofield Engineering Co. Consulting Engineers  
PHILADELPHIA, PA.  
POWER STATIONS GAS WORKS  
HYDRAULIC DEVELOPMENTS ELECTRIC RAILWAYS





## "I Pay for Myself and Help Pay His Wages by Eliminating Oil Waste"

This is what the Gilbert & Barker T-6-H Gallon Self-measuring Pump tells you. Not in so many words, but by its performances.

The old method with its leaky barrels, its leaky spigots, its measures and its funnels, its waste of time and oil is as obsolete as the horse-car.

The Gilbert & Barker Self-Measuring Pump handles paints, varnishes and heavy non-lubricating oils of all kinds. It discharges exact gallons, half-gallons, quarts and pints just as the operator desires, without the use of measures or funnels.

And it looks its efficiency. Finished in green enamel baked on.

Bulletin 60 tells the story  
Send for it today



**Gilbert & Barker Mfg. Co.**

Established 1865  
Springfield, Mass.





America  
Mechanical Supplies  
for all Industries

**What do you need today?**

—for immediate delivery from any one of our strategically located Fairbanks branches:

- Lanterns
- Track Tools
- Shovels
- Hose—all kinds
- Spikes
- Machine Shop Supplies
- Pipe Tools
- Gauges

*and*

practically every other supply that electric railways need in any department.

**Every item bears The Fairbanks Company O. K.—the definite guarantee of good goods.**

## To all points of the compass

**F**OR many years The Fairbanks Company has satisfactorily served Purchasing Departments in the entire industrial field—such purchasers as mills, factories, mines, railroads and steamship lines.

Branch Houses are maintained in principal cities. In each of these Branch Houses an immense range of products, together with

efficient auto truck service, insures prompt deliveries. The individual Branches have complete facilities for any needed after-service.

No similar house has won the world-wide standing enjoyed by The Fairbanks Company.

\* \* \*

**M**OST people know Fairbanks Scales. But it is not generally understood that The Fairbanks Company also markets Mill Supplies, Valves, Machine Tools, Transmission, Trucks and

**MILL SUPPLIES • SCALES • VALVES • MACHINE TOOLS • TRANSMISSION**





Wheelbarrows, Engines and Pumps and other mechanical products of a quality which entitles them to bear The Fairbanks Company O. K.

To carry on this work, The Fairbanks Company, as stated above, now maintains 22 Branch Houses in leading American cities. Here business is done both at wholesale and retail. In addition, prominent dealers in other cities handle many of the Fairbanks products.

Foreign Branch Houses are maintained in London, Glasgow, Paris and Havana. Resident representatives cover the principal commercial countries of the world.

The Fairbanks Company maintains a staff of experienced buyers who give our customers the benefit of volume buying. A force of 400 traveling salesmen, trained in mechanical lines, adds to the service.

**PURCHASING** agents buy in two ways: Orders may be scattered among many sources of supply, or the buyer may find all or a large part of his requirements met by The Fairbanks Company.

In centralizing his buying with The Fairbanks Company, the pur-

chasing agent is in effect dealing with a Mechanical Supplies Department Store. He orders all he needs from one house. All items are put on one bill and delivered nearly always in one shipment. Thus complications are taken out of buying, bookkeeping and handling.

Customers also turn to The Fairbanks Company because:

- (1) Here they find the best in Mill Supplies, Valves, Scales, Engines and Pumps, Transmission, Machine Tools, Trucks, Wheelbarrows, and other mechanical supplies.
- (2) They secure prompt deliveries—insured by immense stocks and motor truck service.
- (3) They find prices right.
- (4) The purchaser further benefits by the thoroughly equipped Service Stations which are maintained in each of the Branch Houses.

A call in person or by telephone at our nearest Branch House will put you in touch with right-hand service, which every Purchasing Department needs.

## THE FAIRBANKS COMPANY

Administrative Offices:  
NEW YORK

### Branch Houses:

Albany	New York
Baltimore	Paterson
Boston	Philadelphia
Birmingham	Providence
Bridgeport	Pittsburgh
Buffalo	Rochester
Chicago	Scranton
Detroit	St. Louis
Hartford	Syracuse
New Orleans	Utica
Newark	Washington

Havana, Cuba  
London, England  
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# The FAIRBANKS Company



TRUCKS & WHEELBARROWS ENGINES & PUMPS



# Roger Babson

says:

**“From an economic standpoint, this is the time to advertise liberally”**

This quotation is from Babson's April "Advice to Sellers."

In the same bulletin he states that the monthly volume of magazine advertising is above that of a year ago by 24 per cent.

Are you keeping up with the modern trend in salesmanship?

Are you making the most of the power and prestige with which this paper can carry your message to your customers?

The Electric Railway Journal covers all departments of the industry—north, east, south and west. Circulation figures open to all and backed by A. B. C. statements.

## Electric Railway Journal

Member Audit Bureau of Circulations  
Member Associated Business Papers, Inc.

Tenth Ave. at 36th St., New York



# A Complete Library on 10 DAYS' TRIAL

## This is your long looked for Opportunity

With the ending of the war, industrial America is teeming and throbbing with the greatest activity in its history. Every day hundreds of men in small positions are raised to bigger responsibilities and bigger pay. A search is being made everywhere for men who have the necessary training to assume these new responsibilities.

## A McGraw-Hill Home Study Course Will Prepare You Quickly

The McGraw-Hill Home Study Courses are founded on actual work as it is done in the great fields of engineering which they cover. No space is wasted with higher mathematics and theory. Only facts, written so that you can understand them. Fifty thousand men are now using them as a daily guide. They are equally valuable to the expert and the beginner.



### Power Plant Library

Power plant practice complete, including mathematics, boilers, engines, electricity, turbines and refrigeration. Now the most used engineers' library in existence. Has enabled thousands of men to pass the most rigid examinations. 2,500 pages, 1,500 illustrations. Eight handsome volumes, bound in the tough T pattern of cloth, as durable as leather. Price \$12, payable \$1.00 per month.

### Factory Management

A set of books written by leading authorities, to help men fit themselves to take complete charge of the shop or factory. Covers industrial organization, administration, purchasing, manufacturing, costs and accounts, engineering of shops, factories and power plants. 6 volumes, 2,300 pages, fully illustrated. Price \$20, payable \$2 in ten days and \$3 per month.

### Croft's Library of Practical Electricity

Without question of more practical value than anything of the kind ever attempted in the world of electricity. Enables you to know electricity as experts know it. Mathematics, practical electricity, electrical machinery, central stations, wiring for light and power, wiring of finished buildings, illumination. 8 flexible volumes, pocket size, 3,000 pages. Price \$16, payable \$2 per month.

### Iron and Steel Library

The high positions in the great iron and steel world are now attainable through this library, which is written by authorities actually engaged in this work. Metallurgy, foundry work, blast furnace construction, operation and products, refractories. A complete iron and steel library. Seven volumes, over 3,000 pages. Fully illustrated. Price complete \$24, payable \$3 per month.

### Machine Shop Library

Machine shop practice complete. Written by eight practical men, well known in the machine shop world. Now the standard in America. No other set of books on the subject ever equalled it in popularity. Mathematics, drawing and design, composition and heat treatment of steel, gears, tool work, grinding, jigs and fixtures, screw machines, dies, etc. 9 volumes, 3,000 pages. Price \$16, payable \$2 per month.

### Metal Mining Library

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Coal mining and colliery practice complete, including outside and inside work—both mechanics and engineering. Of assistance to every man in the business, from the lowest-paid man to the operator. It is now looked upon as a necessity, and as containing the secrets of success in coal mining. 8 volumes, 3,000 pages, 1,700 illustrations. Price \$16, payable \$2 per month.

### Radcliffe's Electricity

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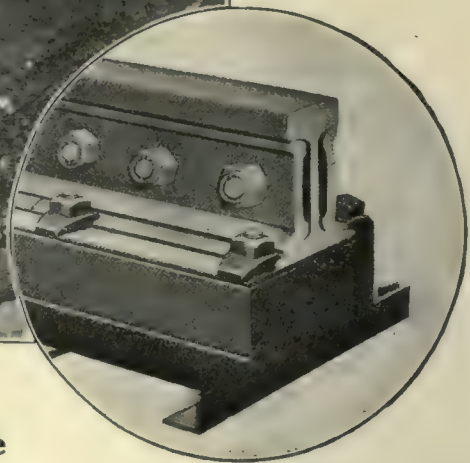
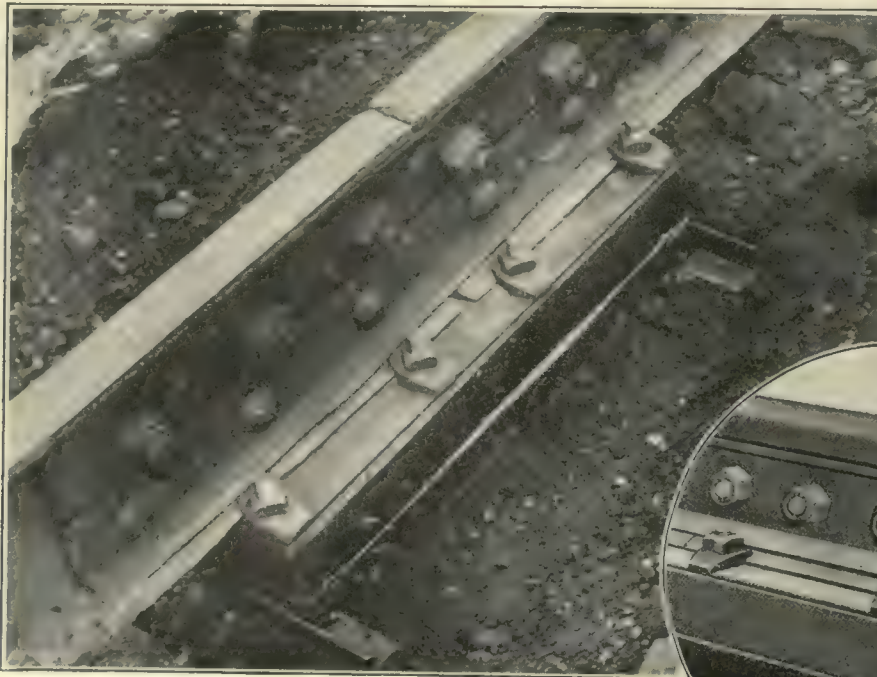
City and State .....

Your employer .....

His address .....

Your occupation ..... E4-26-19





This low, uneven joint was rectified without interrupting traffic—by the

## DAYTON RAIL JOINT BOOSTER

All they did was to cut out the old failure of a supporting structure, clamp and weld the Dayton Booster into place, jack up the rails and fill the hole with concrete! Simple, isn't it? Yet a "Sure Cure" (in the truest sense of that old fashioned expression) for all low joint troubles. The upper illustration gives you a good idea of the

small amount of excavation that is necessary. The lower cut shows a cross-section of this Booster. TRY some on the worst joints in your line and convince yourself that here is a vitally important source of economy that will be mighty welcome in these days of uncertainty.



*Order One for Trial and Be Convinced*

**THE DAYTON MECHANICAL TIE CO.**

201 Third Street Arcade  
DAYTON, OHIO





# **"STANDARD"**

Steel Tires

Steel Tired Wheels

Solid Rolled Steel Wheels

O. H. Steel and Malleable Iron Castings

Solid Forged Gear Blanks

Steel Forgings

Iron Forgings

Forged and Rolled Steel

Pipe Flanges

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*"The 'Standard' Brand on your material  
is an assurance of eventual economy."*



## **STANDARD STEEL WORKS CO.**

GENERAL OFFICES:

**MORRIS BUILDING, PHILADELPHIA, PA.**

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MONTEREY, MEX.

MEXICO CITY  
LONDON, ENGLAND  
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## Can't Beat This Little Outfit

One man can easily put this ERICO Portable Welder on the track and when a car is seen approaching he can take it off just as easily.

The car passes without slackening.

And as for bonding—Well, for truly permanent bonding without injury to the rails, get the ERICO Portable Welder.

*Write for Particulars*

**The Electric Railway Improvement Company  
Cleveland**



Northern Ohio Traction Company—Akron, Ohio

### Until the Rails Wear Out

this street need not be torn up again because the track is laid on Steel Cross Ties.

### **Carnegie Steel Cross Ties with Blast Furnace Slag Concrete**

as a base mean the smoothest, most permanent track—not an annual renewal proposition. Within the last ten years 150 miles of Chicago's surface lines have been placed on Slag Concrete. Service use has determined its merits. Quotations and literature can be had from any Carnegie Office.

**Carnegie Steel Company**

General Offices: Carnegie Building, Pittsburgh, Pa.





## Details of the Cruise

The "South American" is scheduled to leave White Star Docks, Toledo, Ohio, 9 o'clock a. m. Central Standard Time, Monday, June 30, 1919.

Passing thru Lake Erie and Detroit River arriving at Detroit about 2 p. m. same day. Leave Detroit 3 p. m., running up thru Lake St. Clair, the River St. Clair and into Lake Huron, giving a daylight ride. Reach Parry Sound, Georgian Bay a little before noon Tuesday, July 1st. Stop about 2 hours and then run by daylight thru the beautiful Georgian Bay to Owen Sound. Arriving about 6 p. m. and stop about 2 hours. Steamer then proceeds during night to Mackinac Island, arriving there early Wednesday morning, July 2nd. After a couple of hours' stop here the ship will proceed down Lake Michigan, running into Harbor Springs for a couple of hours. Then down the East Coast of Lake Michigan, arriving at Benton Harbor about 10 a. m., Thursday, July 3rd. Then across the lake to Chicago, arriving about 4 p. m., July 3rd.

## CENTRAL ELECTRIC RAILWAY ASSOCIATION'S

### Mid-Summer Meeting and Excursion

Four Days

JUNE 30th to JULY 3rd, inclusive

*Everyone will enjoy this delightful trip*

The "South American," one of the finest exclusively passenger cruising steamers on the Great Lakes, exclusively chartered for this cruise, was built in 1914 for cruising traffic. The dining saloon seats over 280 at one time. A large playroom on an outer deck, entirely enclosed with netting, takes care of the children. The ballroom is on an upper deck and has windows on 3 sides. The ship's regular orchestra will be augmented for this special trip.

Any member of the Association may invite any friends he desires, but tickets for such guests must be secured through the member. Officers and employees of all Electric Railway Lines within territory of the Association are invited whether members or not. Secure tickets as early as possible and avoid disappointments.

Tickets, including meals and berth for the 4 days' cruise, from Toledo or Detroit to Benton Harbor or Chicago, cost \$26.50 each, including War Tax.

*Applications for stateroom reservations and tickets should be made to*

**Mr. John Benham, V-Pres.**

THE INTERNATIONAL REGISTER CO.

15 South Throop Street, Chicago, Ill.

Give name and address of each person who is to use a ticket.

Pay-as-you-enter-reservation.

# **FMB** Grid Resistors

## ARE MADE RIGHT AND STAY RIGHT

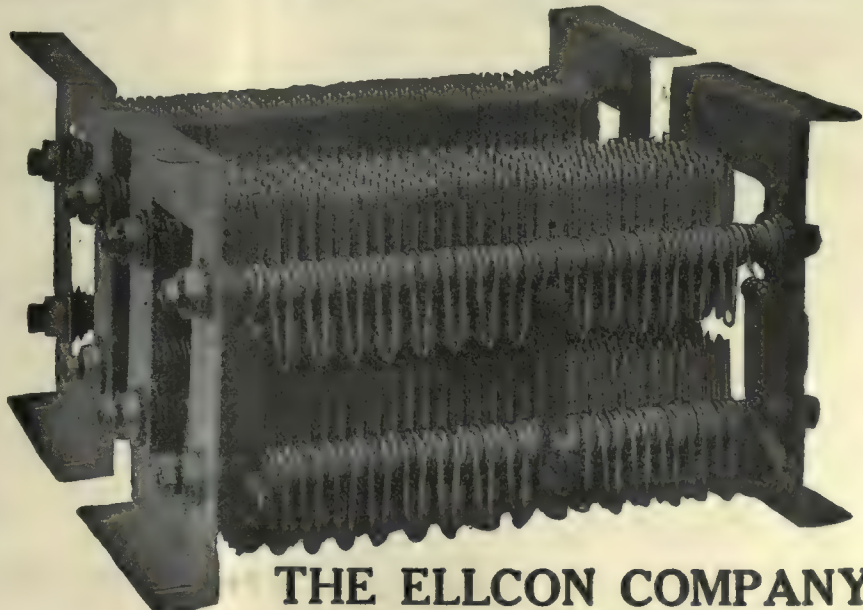
No resistors get more abuse than those under a car.

They are abused electrically by careless operation of the controller.

They are abused mechanically by exposure to dusty, muddy and stone-littered streets.

Until the arrival of E M B drawn, non-corroding grid resistors, troubles from these sources seemed unavoidable.

E M B grid resistors actually have made this part of your equipment troubleproof.



**THE ELLCON COMPANY**

50 Church Street, New York



# Metal Fare Tokens



Enlarged to 1½ times actual size

Nickel-Silver  
Bronze or Brass

Designs developed according to your ideas and subject to your approval. We make the metal, the dies and the tokens.

We have the experience, the equipment, the capacity for rapid quantity production.

*Information on request.*

**Scovill Mfg. Co.**

*Established 1802*

Waterbury, Conn.

New York  
Chicago

Boston  
Detroit



You bought Liberty Bonds for an Ideal—

And our boys went and battled for that Ideal—bled for it and died for it.

Poppies are growing over hundreds of thousands of them.

Victory is ours. But to keep it we must

**Buy  
Victory Bonds**

*Contributed by*

**Electric Railway Journal**



## Straight From Germany

**L**AST Christmas the A. E. F.—from bucks to colonels, cooks and corporals—went down into their own pockets for a gift of two million francs, so that more than three thousand fatherless French babies now have Yanks for foster parents.

We like the little rascals, because they stand for all the little Yanks we've left back home.

We're still on the job—

And we're going to stay till

we know the world is made a safe place for them—and all other youngsters—to grow up in.

We're here to finish that job—right!

Are you with us?

# Victory Liberty Loan

An advertisement originated and produced for the Victory Liberty Loan by members of the American Expeditionary Force.



Contributed by  
**GRIFFIN WHEEL CO.**  
Main Office:  
McCormack Bldg., Chicago, Ill.



IF YE BREAK FAITH WITH THEM WHO DIE  
THEY WILL NOT SLEEP  
THO POPPIES GROW IN FLANDERS FIELDS

**W. J. Jeandron**

173 Fulton Street, New York City

Pittsburgh Offices: 636 Wabash Building

Canadian Distributors:

Lyman Tube & Supply Co., Ltd., Montreal and Toronto

# KERITE

**UNION TERMINAL  
DALLAS, TEXAS**

**KERITE INSULATED WIRE & CABLE COMPANY**  
NEW YORK CHICAGO



# MARSH & MCLENNAN FIRE INSURANCE

Special Attention Given to Traction Insurance

Insurance Exchange, CHICAGO

19 Cedar St. NEW YORK    1615 California St. DENVER    314 Superior St. DULUTH    300 Nicolet Ave. MINNEAPOLIS    Ford Bldg. DETROIT    17 St. John St. MONTREAL    23 Leadenhall LONDON

THESE OFFICES WILL GIVE YOU THE BEST THERE IS IN INSURANCE SERVICE



**P & H POLES**  
Dependable Service  
**PAGE & HILL CO.**  
Minneapolis Chicago New York  
Kansas City Houston

Michigan

Western

**CEDAR POLES**  
POSTS, TIES AND PILING  
BUTT TREATING

**The Valentine-Clark Co.**  
General Office: Minneapolis, Minn.  
Toledo, Ohio; Chicago, Ill.; Kansas City, Mo.; St. Maries, Idaho.

## THE LINDSLEY BROTHERS CO.

Western "Good Poles Quick" Northern

Quick Shipments Rooms 832 834, 72 West. Adams St. Butt Treating  
from our CHICAGO, ILL. Open Tank and  
Minneapolis "Hot and Cold"  
Yard Spokane — St. Louis Processes

## TIES

UPPER MICHIGAN WHITE CEDAR

WHITE MARBLE LIME CO., (Cedar Dept.,) Manistique, Mich.

## WESTERN CEDAR POLES

Grinnell, Ia. **B. J. CARNEY & Co.** Spokane, Wn.

1729 McCormick Bldg. Chicago  
Quick Service Yard & Butt Treating Plant  
in Minneapolis

## FEDERAL SIGNAL CO.

ALBANY, N. Y.

CONSULT OUR ENGINEERS ON YOUR  
SIGNAL REQUIREMENTS

52 Vanderbilt Avenue, New York    Monadnock Block, Chicago  
118-130 New Montgomery St., San Francisco, Cal.

## Peirce Forged Steel Pins with Sheet Steel Thimbles

Your best insurance against insulator breakage

**Hubbard & Company**

PITTSBURGH, PA.

## "NATIONAL"

TUBULAR STEEL POLES

Ask for "NATIONAL" Bulletin No. 14, "NATIONAL" Tubular Steel Poles  
**NATIONAL TUBE COMPANY, PITTSBURGH, PA.**

## DREW MOTORMEN'S SAFETY MIRRORS

Eliminate Accidents

Send for catalogue No. 18

**DREW ELECTRIC & MFG. CO.**  
1016 E. Michigan St., Indianapolis, Ind.



## U. S. Electric Contact Signals for

Single-track block-signal protection  
Double-track spacing and clearance signals  
Protection at intersections with wyes  
Proceed signals in street reconstruction work

**United States Electric Signal Co.**  
West Newton, Mass.

## AETNA INSULATION LINE MATERIAL

Third Rail Insulators, Trolley Bases, Harps and Wheels, Bronze  
and Malleable Iron Frogs, Crossings, Section Insulators, Section  
Switches.



Albert & J. M. Anderson Mfg. Co.

289-93 A Street. Boston, Mass.

Established 1877

Branches—New York, 135 B'way, Phila.  
delphia, 429 Real Estate Trust Bldg. Chicago, 105 So. Dearborn St.  
London, 48 Milton Street



## Chapman Automatic Signals

Charles N. Wood Co., Boston



## Transmission Line and Special Crossing Structures, Catenary Bridges

WRITE FOR OUR NEW DESCRIPTIVE CATALOG.

**ARCHBOLD-BRADY CO.**

Engineers & Contractors

SYRACUSE, N. Y.

**Rome-Wire**

Bare and Tinned Copper Wire  
Magnet Wire, Rubber Covered Wire  
**Rome Wire Co., Rome, N. Y.**



## Aluminum Company of America

Manufacturers of

# ALUMINUM

## Electrical Conductors

All-Aluminum and Steel Reinforced  
for

Transmission Lines  
Railway and Industrial Feeders  
Signal Circuits  
Railway Catenary Construction  
Bus Bars

also

Ingots—Rods—Rivets—Extruded Shapes  
Sheet Tubing

also

Aluminum Solders and Flux  
Flux and Wire for Autogenous Welding

### GENERAL SALES OFFICE

Oliver Bldg., Pittsburgh, Pa. U. S. A.

Canada: Northern Aluminum Co., Ltd., Toronto.

Latin America: Aluminum Co. of South America, Pittsburgh, Pa.

England: Northern Aluminum Co., Ltd., London.

## STEEL POLES FOR EVERY POLE PURPOSE



Cut shows Bates Steel Poles in use by the Royal Swedish States Rys., electrifying the steam railroads of Sweden, Lapland, located about 75 miles south of the Arctic Circle, in the land of the Midnight Sun, the most northerly railroad of the world.

Bates Steel Poles are becoming universally popular world wide. Repeat orders testify their general suitability for every Pole purpose.

Telegraph, Telephone, Power Transmission, Electric Trolley Lines, Electric Lighting, Etc.

Highest class and most up-to-date steel pole equipment in the world. Our STEEL POLE TREATISE tells the story. Ask for it.

About 2,000 tons of steel constantly on hand; hence prompt shipments.

Tubular Steel Poles cost 50 per cent. more than Bates Steel Poles, yet Bates Poles are 100 per cent. stronger—will last 100 per cent. longer, cover a much broader range of adaptability and are much more artistic than Tubular Poles. Ask us to verify these facts.

BATES EXPANDED STEEL TRUSS COMPANY

208 So. LaSalle Street

Chicago, Ill., U. S. A.



### WEATHERPROOF WIRE AND CABLE

PAPER INSULATED  
UNDERGROUND CABLE  
(Single, Duplex and Three Phase)

TROLLEY WIRE  
(Round, Grooved or Figure 8)

BARE COPPER WIRES  
AND CABLES

MAGNET WIRE  
(Cotton or Asbestos)

Americanite Rubber Covered Wire Galvanized Iron and Steel  
Incandescent Lamp Cord Wire and Strand

### AMERICAN ELECTRICAL WORKS

Phillipsdale, R. I.

Boston, 176 Federal; Chicago, 112 W. Adams; Cincinnati, Traction Bldg.;  
New York, 233 B'way; San Francisco, 612 Howard; Seattle, 100 1st Ave. So.

## ARMCO IRON Welding Rods

OXY-ACETYLENE

ELECTRIC

make safe welding easy

ARMCO IRON Rods are practically pure iron and are peculiarly free from the sulphur, phosphorous, slag, oxides and other impurities that ordinarily destroy the homogeneity of the weld.

## PAGE STEEL & WIRE CO.

Sales Offices: 30 Church St., New York

Plants: Monessen, Pa., and Adrian, Mich.

Western Representatives:

Steel Sales Corporation, Chicago

Pacific Coast Representatives:

American Rolling Mill Co., San Francisco

Canadian Distributors: Taylor & Arnold, Limited, Montreal and Winnipeg



## JOHN A. ROEBLING'S SONS CO.

TRENTON, NEW JERSEY

Manufacturers of



RUBBER COVERED WIRE

WEATHERPROOF WIRE

LEAD ENCASED CABLES

MAGNET WIRE

ALL KINDS OF INSULATED WIRE

## Dependable Track Work for Electric Railways



Frogs, Switches, Switch Stands, Crossings, Special Track Work, Machine and Drop Forgings, Pressed Steel and Hammer Work. Foundry for Manganese Steel Castings and special facilities for heat treating. Let us bid on your requirements.

ST. LOUIS FROG & SWITCH CO.

ST. LOUIS, MO.



**NO CORROSION METAL**

## "ACME" (NESTABLE) CORRUGATED CULVERTS



Miles upon miles of "ACME" are in use under Steam and Electric Railways.

You'll find them in every state of the Union and in many Foreign Countries.

You'll find them under deep fills and shallow fills in every soil and climate.

**YOU'LL FIND THEM MAKING GOOD EVERYWHERE.**

Eleven years of service have proven their lasting qualities.

Use has also proven that for every usual culvert service they possess

### Abundant Strength

Our Catalog M-21 is yours for the asking



## BARBOUR-STOCKWELL CO.

205 Broadway, Cambridgeport, Mass.  
Established 1858

Manufacturers of

**Special Work for Street Railways**

Frogs, Crossings, Switches and Mates  
Turnouts and Cross Connections  
Kerwin Portable Crossovers  
Balkwill Articulated Cast Manganese Crossings

ESTIMATES PROMPTLY FURNISHED

## SPECIALISTS

in the

### Design and Manufacture of Standard—Insulated—and Compromise Rail Joints.

**The Rail Joint Company**  
61 Broadway, New York City

## HIGHEST QUALITY

### TRACK SPECIAL WORK



### WE MAKE THIS GRADE ONLY

**CLEVELAND FROG & CROSSING CO.**  
CLEVELAND, OHIO

**AWARDED**  


## American Rail Bonds

**Crown  
United States  
Twin Terminal  
Soldered**

**American Steel & Wire Company**  
Chicago New York Cleveland Pittsburgh Worcester Denver

Export Representative: U. S. Steel Products Co., New York  
Pacific Coast Representative: U. S. Steel Products Co.  
San Francisco Los Angeles Portland Seattle

## RAMAPO

Automatic Safety and Automatic Return Switch Stands for Passing Sidings. Tee Rail Special Work for Interurban Lines and Private Rights of Way. Manganese Construction a Specialty.

### Ramapo Iron Works

HILLBURN, NEW YORK  
Plants at Hillburn, N.Y. and Niagara Falls, N.Y. New York Office, 30 Church Street

## T RAILS AND NELSONVILLE FILLER AND STRETCHER BRICK

offer all the advantages without the disadvantages of the groove rail.

Construction approved by City Engineers.

**THE NELSONVILLE BRICK CO., Nelsonville, Ohio**

## EUREKA PRODUCTS

Commutators, Trolley Wheels, Sleet Trolley Wheels, Trolley Ears, Line Material, Controller Fingers, Brush Holders, etc.

We make quality goods.

**THE EUREKA COMPANY, North East, Pa.**

## THE WEISS SWITCH LOCK PREVENTS SPLIT SWITCHES

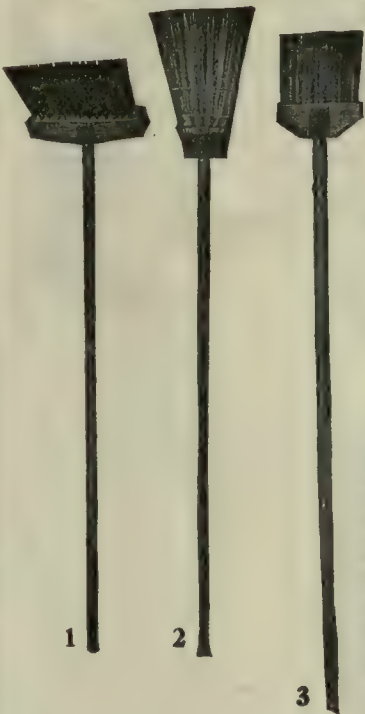
A positive locking switch lock that locks right and left. Water-proof, non-freezable, mud-proof and sand-proof. Simple in construction, perfect in operation and easily installed. Positively prevents split switches.

Write for complete information and quotations.

**WEISS SWITCH LOCK CO., 600 Capitol Ave., Springfield, Ill.**



# A Great Combination

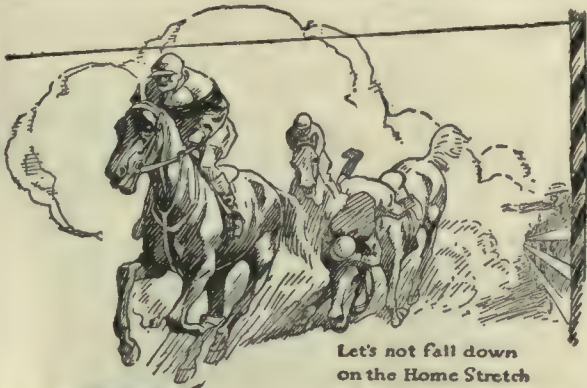


- No. 1. Flat Wire, to sweep crossings.
- No. 2. Split Bamboo, to handle light dirt and snow in the frogs, switches, and curves.
- No. 3. Flat Wire, to remove ice, slush and mud from the same places and a chisel point on the end of the handle to loosen the ice and crust.

None superior are produced for purposes intended. No. 1 supplied with or without handles, and No. 2 and 3 have a chisel on the end of handle to cut the crust and ice, but are supplied without chisel if desired.

Write for prices

**J. W. PAXSON CO., Mfrs.**  
1021 N. Delaware Ave., Philadelphia, Pa.



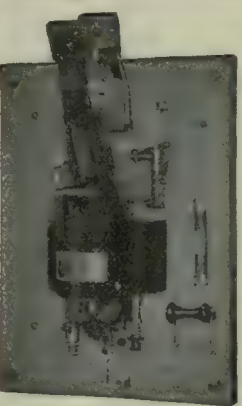
Let's not fall down  
on the Home Stretch

## Under the Wire a WINNER

Come on, you Victory Loan!  
America never yet rode a loser!  
You've got a record of four straight  
—make it five!  
Help ride the Victory Loan to victory  
by buying your bonds today.  
You'll find it the best winner you  
ever backed!  
Go in to your limit.

Victory Liberty Loan Committee

**THE BABCOCK &  
WILCOX COMPANY**  
85 Liberty Street, New York



## AUTOMATIC RECLOSING CIRCUIT BREAKERS

know when to reclose as  
well as when to open.

*Bulletin No. 301 gives the  
details. Write for your  
copy.*

**The Automatic Reclosing  
Circuit Breaker Co.**  
Columbus, Ohio, U.S.A.

## SPECIAL TRACK WORK

SWITCHES, FROGS AND CROSSINGS.  
ANTI-KICKING BIG HEEL  
SWITCHES.



TRACK WORK  
OF EVERY DESCRIPTION.  
HARD CENTER CONSTRUCTION.

Balkwill Articulated Cast Manganese Crossings

**New York Switch & Crossing Co.**  
Hoboken, N. J.

## SPECIFY THE TERRY TURBINE

**For Driving Your Auxiliaries**  
**TERRY STEAM TURBINE CO.**  
Hartford, Conn.

When writing to Advertisers in this publication you will confer a favor on both publisher and advertiser by mentioning the  
**Electric Railway Journal**



## Blaw Mixers

Blaw-Mixer  
Plate Mills  
Ironing Machine  
Fiberglass Sheet  
Paper Machine  
Blaw-Mixer  
Blaw-Mixer Company  
Pittsburgh, Pa.

**WE-FU-GO AND SCAIFE**

**WATER**

PURIFICATION SYSTEMS  
SOFTENING & FILTRATION  
FOR BOILER FEED AND  
ALL INDUSTRIAL USES

**WM.B.SCAIFE & SONS CO. PITTSBURGH, PA.**



## The SCOOP CONVEYOR

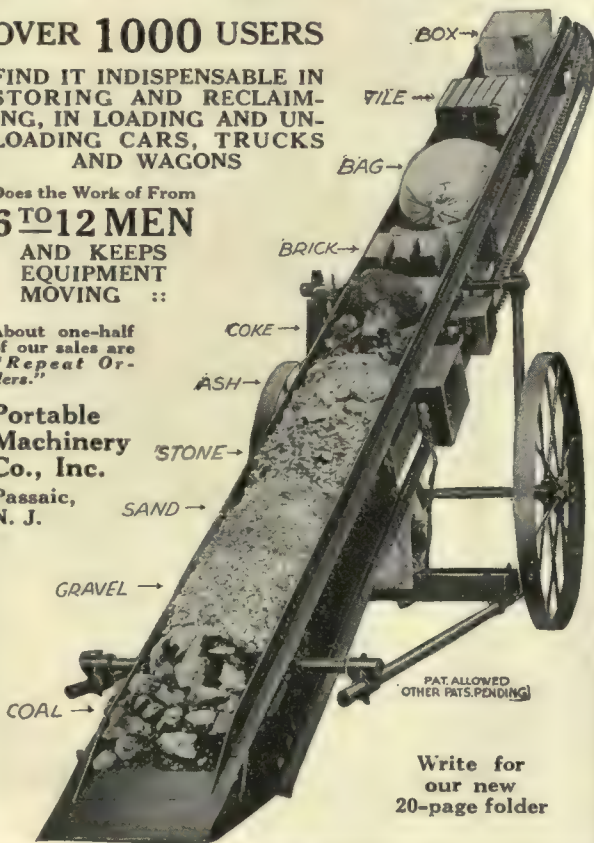
OVER 1000 USERS

FIND IT INDISPENSABLE IN  
STORING AND RECLAIM-  
ING, IN LOADING AND UN-  
LOADING CARS, TRUCKS  
AND WAGONS

Does the Work of From  
**6 TO 12 MEN**  
AND KEEPS  
EQUIPMENT  
MOVING ::

About one-half  
of our sales are  
"Repeat Or-  
ders."

Portable  
Machinery  
Co., Inc.  
Passaic,  
N. J.



Write for  
our new  
20-page folder

Full power with  
High or Lower Adjustment

Many emergencies requiring a  
powerful jack present a diffi-  
culty in bringing the jack to  
bear on the load. The

**Buckeye Emergency  
Jack No. 239 Special**

saves time, strength and trouble.  
The many positions to which it  
is adjustable easily solve per-  
plexing lifting problems. Full  
details in our catalog. Write  
for it.

**The Buckeye  
Jack Mfg. Co.**

Alliance, Ohio



**32,680 MILES**

was the distance covered before  
this set of brushes was in-  
spected. Even then they were  
in excellent condition and good  
for several thousand additional  
miles. Other brushes delivered  
18,000 or less.

**U S G Brushes**

are especially designed for the serv-  
ice in which they are to operate.

**THE UNITED STATES GRAPHITE COMPANY**

Saginaw, Michigan, U. S. A.

Branch Offices: New York, Pittsburgh, Philadelphia, Atlanta,  
Chicago, St. Louis, Denver, San Francisco.

## NILES-BEMENT-POND CO.

111 BROADWAY, NEW YORK

### MACHINE TOOLS

For Electric Railway Repair Shops

Axle Lathes  
Wheel Presses  
Chamfers, Drills  
Sizers, Planers  
Steam Hammers  
Electric Travelling  
Cranes

Send  
for  
Catalogs



LET  
**TOLEDO CRANES**  
LIFT YOUR LOAD



Get in touch with us

**TOLEDO BRIDGE & CRANE CO.**

TOLEDO, OHIO

New York Office, 52 Broadway  
Philadelphia Office, 2012 Market St.  
Pittsburgh Office, 203 Oliver Bldg.

Cleveland Office, 725 Citizens Bldg.  
Chicago Office, 549 Washington Bldg.  
San Francisco Office, Rialto Bldg.

## Foster Superheaters

Insure uniform superheat at temperature specified

**Power Specialty Company**

111 Broadway, New York City

## GREEN CHAIN CRATES

**GREEN ENGINEERING CO. East Chicago, Ind.**



## I. T. E. Circuit Breakers

for heavy street railway work are  
the best obtainable. Write for New  
Complete Catalogue.

## Superheaters for Stationary Service

The Elesco Superheater adapted to the conditions  
in your plant is a certain means to improve your  
plant economy.

Write for Bulletin BT-1.

**LOCOMOTIVE SUPERHEATER CO.**

30 Church Street, New York City

Chicago  
Peoples Gas Bldg.

Pittsburgh  
Oliver Bldg.

Montreal  
Transportation Bldg.



## Williams' Superior Drop-Forged Wrenches

*Big Ones  
Little Ones  
Bent Ones  
Straight Ones  
Thick Ones  
Thin Ones*

40 Standard Patterns in about 1000 sizes with openings from 3/16 to 7 5/8 inches.

Ask for Booklet.

## J. H. Williams & Co.

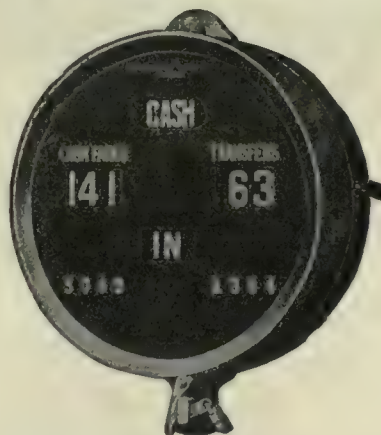
"The Wrench People"

Western Office and Warehouse:  
143 South Clinton Street  
Chicago, Ill.

General Offices:  
143 Richards Street  
Brooklyn, N. Y.



## International Fare Registers



International Coin Registers; Coin and Transfer Registers; Coin, Metal Ticket and Transfer Registers, both hand and motor driven, for cars, stations, ferries, park or terminal use. Single and double fare registers. Agents for Heeren enamel badges.

**The International Register Company**  
15 South Throop Street, Chicago

## INSULATING TAPE

Quality

**STANDARD**  
Woven Fabric Co  
Walpole, Mass.



## Simplex Jacks

for  
Railroads-Contractors-Industries  
Automobiles-Pole Pulling and Ordnance

**Templeton, Kenly & Co., Ltd.**  
Established 1899  
London Chicago Paris



## "Everything in Insulation"

Mica  
Vulcanized Fibre  
Varnished Cloth  
Insulating Tapes  
Waxes  
Asphalts  
Compounds  
Insulating Varnish

The above are only a few of our products  
Write us for anything in this line you may require.

**MITCHELL-RAND M'FG CO.**  
103 John St., New York City



## BAKELITE-DILECTO

Insulating Material  
*Tough — Hard — Flexible*

A one-eighth inch sheet stood a test of 100,000 volts. **BAKELITE-DILECTO** is the perfect, permanent and economical insulation for your power plant.

Write for particulars.

**THE CONTINENTAL FIBRE CO.**

Newark, Delaware

Pittsburgh Office  
301 Fifth Ave.

New York Office  
233 Broadway

Chicago Office

332 S. Michigan Ave.

San Francisco Office  
525 Market St.

Los Angeles Office  
411 S. Main St.

## FORD TRIBLOC

A Chain Hoist that excels in every feature. It has Planetary Gears, Steel Parts, 3 1/2 to 1 factor of Safety. It's the only Block that carries a five-year guarantee.

**FORD CHAIN BLOCK & MFG. CO.**

Second and Diamond Sts., Philadelphia

## HOT GALVANIZING

We guarantee immediate deliveries; reasonable prices; first class workmanship to stand any test. No tapping necessary on threads of bolts after galvanizing. Galvanized angles furnished cut and bent to length and punched.

**JOSEPH P. CATTIE & BROS.**  
Gaul and Adams Sts., Philadelphia, Pa.

## A Single Segment or a Complete Commutator

is turned out with equal care in our shops. The orders we fill differ only in magnitude; small orders command our utmost care and skill just as do large orders. **CAMERON** quality applies to every coil or segment that we make, as well as to every commutator we build. That's why so many electric railway men rely absolutely on our name.

**Cameron Electrical Mfg. Co., Ansonia, Connecticut**





Hale & Kilburn  
No. 108-AV Stationary Seat  
For One-Man Safety Cars.

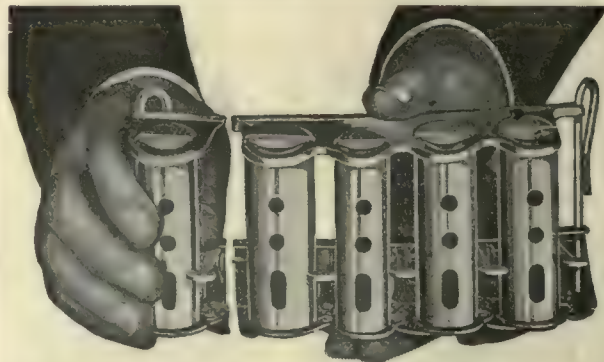
The unmatched H&K Seat beats the world for strength and lightness. Every Safety Car should be equipped with it.

## HALE & KILBURN CORPN.

New York  
Detroit  
Louisville

Philadelphia  
Chicago  
Washington  
San Francisco

St. Louis  
Atlanta  
Dallas



### A Great Improvement in Coin Changers

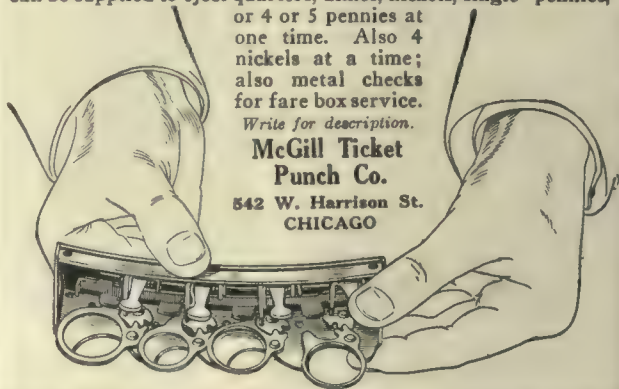
The McGill HIGH-SPEED Lever-operated Changer is now built with a gear movement instead of a curved cam. If desired a fifth barrel can be attached, which will meet all practical requirements of fare collections. The new machine can be supplied to eject quarters, dimes, nickels, single pennies,

or 4 or 5 pennies at one time. Also 4 nickels at a time; also metal checks for fare box service.

Write for description.

McGill Ticket  
Punch Co.

542 W. Harrison St.  
CHICAGO

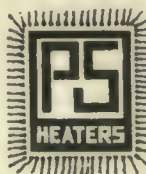


## "It Behooves You to Hooverize Your Motormen"

We can help you

Write to

The Arthur Power-Saving Recorder Co.  
2nd National Bank Bldg., New Haven, Conn.



### Car Heating and Ventilation

is one of the winter problems that you must settle without delay. We can show you how to take care of both with one equipment. Now is the time to get your cars ready for next winter. Write for details.

The Peter Smith Heater Company

1725 Mt. Elliott Ave., Detroit, Mich.

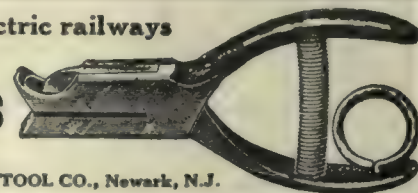
75% of the electric railways

use

### B-V Punches

Send for Catalog.

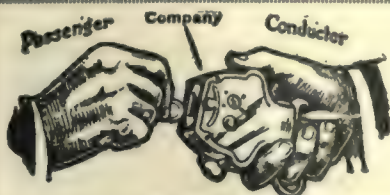
BONNEY-VEHSLAGE TOOL CO., Newark, N.J.



Use them in your terminals—  
**PEREY TURNSTILES**  
or **PASSIMETERS**

Faster than the ticket seller

Perey Manufacturing Co., Inc.  
30 Church Street, New York City



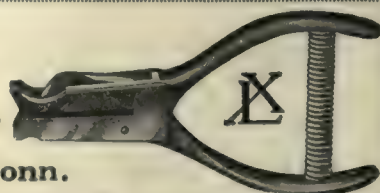
Direct  
Automatic  
Registration  
By the  
Passenger

Rooke Automatic  
Register Co.  
Providence, R. I.

The Big Three  
**D & W Fuses, Deltabeston Wire**  
**D & W Oil Fuse Cutouts**  
D & W Fuse Co., Providence, R. I.

**EXELL**  
**MFG. CO.**

New Haven, Conn.





# Holden & White Inc.

Electric Railway Sales Distributors for:

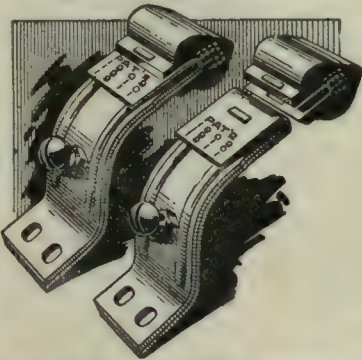
- Anderson Brake Slack Adjusters.
- Garland Ventilators. Miller Trolley Shoe.
- Perry-Hartman Center Plates and Side Bearings.
- Jewel Hot Blast Heaters.
- Wasson Air-Retrieving Trolley Bases (U. S.).
- Reliance Air Sanders. Air Rectifier.

Chicago District Representatives for:

- Drew Line Material
- Columbia Car & Shop Equipment
- Lincoln Rail Bonding and Bonds
- Atlantic Equipments for Joint Welding
- Earle Trolley Catchers and Retrievers

817 Fisher Building CHICAGO  
Branch Office—2213 Dime Bank Bldg., Detroit

# The Trigger-Lock Reversible Controller Finger



saves Labor, Time and Money. Used as standard on 200 Roads

U. S. Factory  
814-8 Bath Ave.  
Niagara Falls, N. Y.  
Canadian Factory  
557 King St., West.  
Toronto, Canada.



# Pedigreed Gears

THE registering of every Nuttall Gear was begun more than twelve years ago. By giving each gear an identity, it made possible the gathering of a great mass of data on gear performance, and the results are evident in the superior quality of Nuttall Gears and Nuttall Engineering Service today.

But Nuttall is not resting content with what has been done. It has not for a single moment relaxed its efforts to produce better and better gears. So Nuttall registration continues not only for your protection but as a means of achieving still greater results.

R. D. NUTTALL CO.  
Pittsburgh, Pa.

# Nuttall Gears

EVERY GEAR REGISTERED



# Heating and Ventilating

Let us demonstrate to you how we can heat and ventilate your cars at the lowest possible cost

The Cooper Heater Company  
Carlisle, Pa.

Electric car heaters—thermostatic control—pneumatic car door operators—buzzers, single-stroke bells, starting signal lights—special resistances.

CONSOLIDATED CAR HEATING CO.  
ALBANY, NEW YORK, CHICAGO

# WE CAN CUT YOUR COST OF HEATING CURRENT

Write for THERMOSTATIC CONTROL INFORMATION

GOLD

ELECTRIC HEATERS Cut Installation and Maintenance Charge.

VENTILATORS Also Ventilate in Stormy Weather. THERMOSTATS Save Current.

ORIGINATED the use of NON-CORROSIVE Wire for Electric Car Heaters.

ORIGINATED The Ventilated Coil Support.

LET US FIGURE ON YOUR NEXT REQUIREMENTS  
Gold Car Heating & Lighting Co., 17 Battery Pl., New York

# "Boyerized" Products Reduce Maintenance

- |                              |                          |
|------------------------------|--------------------------|
| Bemis Trucks                 | Manganese Brake Heads    |
| Case Hardened Brake Pins     | Manganese Transom Plates |
| Case Hardened Bushings       | Manganese Body Bushings  |
| Case Hardened Nuts and Bolts | Bronze Axle Bearings     |

Bemis Pins are absolutely smooth and true in diameter. We carry 40 different sizes of case hardened pins in stock. Samples furnished. Write for full data.

Bemis Car Truck Co., Springfield, Mass.

# PROVIDENCE H-B FENDERS LIFE GUARDS

The Consolidated Car Fender Co., Providence, R. I.  
Manufacturers of The Providence Fender and H-B Life Guard  
Wendell & MacDuffie Co., 61 Broadway, New York  
General Sales Agents



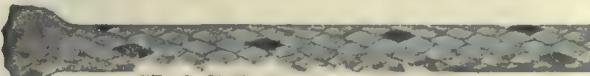
MASON SAFETY TREAD—Lead or carborundum filled; non-slippery; prevents accidents; cuts out damage suits.

KARBOLITH CAR FLOORING—For steel cars; is sanitary, light weight, fire proof, non-slippery.

STANWOOD STEPS—Self-cleaning, non-slippery, light. Over six million feet used without accident being reported within the knowledge of manufacturer.

Our products used on all leading railroads on cars and stations. For details address:

AMERICAN MASON SAFETY TREAD CO., Lowell, Mass.  
Branch Offices: Boston, New York City, Philadelphia.  
Agencies in all principal cities.



"Trade Mark Reg. U. S. Pat. Off."

Samson Spot Waterproof Trolley Cord  
Made of fine cotton yarn braided hard and smooth. Inspected and guaranteed free from flaws. Proved to be the most durable and economical. Samples and information gladly sent.  
1 SAMSON CORDAGE WORKS, BOSTON, MASS.



# SEARCHLIGHT SECTION

## Get Your Wants into the Searchlight

### ADVERTISING RATES

#### Ads Set in Uniform Style

(Solid, in one paragraph, without display.)

**THREE CENTS A WORD**, minimum charge 50 cents an insertion, payable in advance, less 10 per cent. If one payment is made in advance for four continuous insertions—for advertisements under:

Positions Wanted	Vacation Work Wanted
Evening Work Wanted	Salesman Wants Connections
<b>FIVE CENTS A WORD</b> , minimum charge \$1.50 an insertion, for advertisement under:	
Agencies Wanted	Positions Vacant
Agents Wanted	Partner Wanted
Business Opportunities	Representations Wanted
Desk Room for Rent	Salesmen Wanted
Educational	Patents for Sale
Employment Agencies	Plants for Sale
Desk Room Wanted	Sub-Contracts Wanted
Foreign Business	Work Wanted
Miscellaneous for Sale, for Rent or Want Ads.	

**THIRTY CENTS A LINE**, minimum five lines, for all undisplayed advertisements set with a paragraph for each item or tabulated.

**THREE DOLLARS AND SIXTY CENTS AN INCH** for advertisements for bids (Official Proposals).

#### Ads Set in Display Type

(Individual space, within border rules.)

Space for these advertisements is sold by the inch. Each page contains 30 inches. The rate per inch is based on the total number of inches to be used—that is, the number of inches the advertisement is to occupy multiplied by the number of insertions it is to receive. For instance, a 2-inch advertisement in 2 issues earns the 4-inch rate of \$2.90 an inch. A 1-inch space for 4 issues, or a 4-inch space in one issue, also earn the 4-inch rate.

#### SCHEDULE OF RATES

1 to 3 in., \$3.00 an in.	15 to 26 in., \$2.70 an in.
4 to 7 in., 2.90 an in.	27 to 49 in., 2.60 an in.
8 to 14 in., 2.80 an in.	50 to 99 in., 2.50 an in.

Rates for larger space furnished on request.

*For quick and satisfactory results  
tell the reader everything that  
he will want to know.*

### INFORMATION

**ALLOW FIVE WORDS** for the address, if replies are to a box number in care of any of our offices. There is no extra charge for forwarding replies.

**IN REPLYING TO ADS**, do not enclose original testimonials or anything that you may want returned. State your experience and qualifications in as concise and neat a manner as possible and enclose copies of your testimonials.

**BE CAREFUL TO PUT ON ENVELOPE**, when answering any "blind" ad, the box number in the ad, the name of the paper, and also the local address of office to which reply is sent:

36th St., at 10th Ave.,	New York
935 Real Estate Trust Bldg.,	Philadelphia
657 Leader-News Bldg.,	Cleveland
1570 Old Colony Bldg.,	Chicago
519 Newhouse Bldg.,	Salt Lake City
501 Rialto Bldg.,	San Francisco

**WHEN ADVERTISING MACHINERY**, use your own name and address—or a local address of some kind—so that the readers can wire direct and get quick replies. We advise also that you state in your advertisement the present location of plant that is offered for sale, or point of delivery provided you are in the market for equipment.

**TO SIGN YOUR NAME** and address to your advertisement begets the confidence of the reader and facilitates receiving replies. You can, however, obviate delay in receiving answers by signing your ad. only with initials (your own or others), care of your home, your office or a post-office box number in your city.

### POSITIONS VACANT

**ARMATURE** winder of experience in railway motors wanted in city in central New York State. State salary and experience. P-378, Elec. Ry. Journal.

**CIVIL** engineer wanted in Way and Structures Department; experienced; for track work or designing structures; state age, education, experience, references and wages desired. P-388, Elec. Ry. Journal.

**DRAFTSMAN** wanted, experienced in calculating and designing street railway special track work. State salary and experience. The Buda Co., Harvey, Ill.

**ELECTRICAL** and civil engineer wanted, capable of supervising roadway construction and maintenance, trolley construction and lighting distribution system, construction, supervision and operation of central station, capable of making investigation and appraisal of street railway plant. Address with references. Apply to P-390, Elec. Ry. Journal, Chicago.

**HIGH-GRADE** chief engineer wanted for direct current power house street railway system. Rated capacity of machinery 4000 kilowatts. Give experience and references. P-389, Elec. Ry. Journal.

**MASTER** mechanic wanted between the ages of 30 and 40 years; must be an electrical and mechanical engineer, a live wire and come well recommended. Address P-391, Elec. Ry. Journal, Chicago.

### CIVIL SERVICE OPPORTUNITIES

**INSPECTOR** of equipment (car and car-house apparatus) May 24; salary, \$901-\$1200. State Civil Service Commission, Albany, New York.

### POSITIONS WANTED

**AN** energetic, sober, ambitious 33 year old man, 16 years' experience in street railway transportation with large company. Thoroughly familiar with every detail of the department, including making traffic surveys, making and adjusting schedules and employing, training and handling men, desires position as transportation superintendent. Present employer as reference. PW-377, Elec. Ry. Journal, Leader-News Bldg., Cleveland.

**AUDITOR**, comptroller, broad experience in finances and accounting with large utility interests, both railway and lighting; competent executive and organizer. References and business history upon request. PW-392, Elec. Ry. Journal, Leader-News Bldg., Cleveland.

**POSITION** by man experienced in armature winding, controller repairing and car wiring with good chance for advancement. Western states preferred. PW-376, Elec. Ry. Journal, Philadelphia.

**YOUNG** married man wants position as armature winder, controller or wireman; 10 years' experience; experienced on safety car maintenance and all types of air equipment. Good references. PW-385, Elec. Ry. Journal.

**POSITION** as general freight agent with electric line; have had 16 years' experience as general express and freight agent; can furnish best of references. George Dimford, 59 Marshall St., Rochester, N. Y.

### POSITIONS WANTED

**SUPERINTENDENT** transportation; open for engagement after May 1st; 12 years' experience working from the bottom up as motorman, conductor, dispatcher, trainmaster, cashier and superintendent transportation both city and interurban. A-1 reference. PW-393, Elec. Ry. Journal, Chicago.

### CARS FOR SALE

2—McKean Gaso-Electric Cars.  
12—Differential 20-yd. Cars.  
5—Gasoline Passenger Cars.  
50—Freight Cars.  
12—Electric Sets.

Get our List and Prices.

J. F. DONAHOO CO., Birmingham, Ala.

### WANTED

Direct Current

## ELECTRIC LOCOMOTIVE

Address

**CENTRAL WAREHOUSE CO.**  
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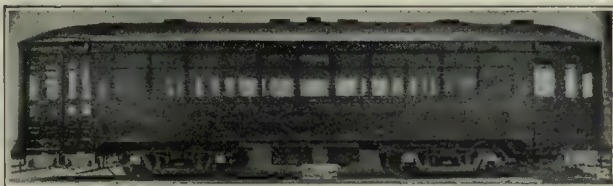
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## COMPLETE ELECTRIC RAILWAY SYSTEM

- 1—General Electric direct current 720 r.p.m., 1200 volt, 167 amp. Railway type Generator for belt drive. Complete with switch-board containing all instruments, including circuit breaker.
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- 28 ft. over corner posts
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# WHAT AND WHERE TO BUY

Equipment, Apparatus and Supplies Used by the Electric Railway Industry with  
Names of Manufacturers and Distributors Advertising in this Issue

- Advertising, Street Car**  
Collier, Inc., Barron G.
- Air Rectifiers**  
Holden & White, Inc.
- Anchors, Guy**  
Electric Service Supplies Co.  
Holden & White, Inc.  
Ohio Brass Co.  
Westinghouse Elec. & M. Co.
- Ash Storage Tanks, Cast Iron**  
Green Engineering Company
- Automobiles and Buses**  
Brill Co., The J. G.
- Axle Straighteners**  
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- Axles, Car Wheel**  
Bemis Car Truck Co.  
Brill Co., The J. G.  
Carnegie Steel Co.  
National Railway Appliance Co.  
St. Louis Car Co.  
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Columbia M. W. & M. I. Co.
- Badges and Buttons**  
Electric Service Supplies Co.  
International Register Co., The
- Batteries, Dry**  
Nichols-Lintern Co.
- Batteries, Storage**  
Electric Storage Battery Co.
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Eureka Co.  
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St. Louis Car Co.  
Westinghouse Elec. & M. Co.
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- Bells and Gongs**  
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St. Louis Car Co.
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Reading Specialties Co.  
Niles-Bement-Pond Co.  
Zelnicker, Walter A., Supply Co., Inc.
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Babcock & Wilcox Co.
- Boiler Tubes**  
National Tube Co.
- Bond Testers**  
American Steel & Wire Co.
- Bonding Apparatus**  
American Steel & Wire Co.  
Electric Railway Improvement Co.  
Electric Service Supplies Co.  
Ohio Brass Co.
- Bonds, Rail**  
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Electric Railway Improvement Co.  
Electric Service Supplies Co.  
General Electric Co.  
Ohio Brass Co.  
Westinghouse Elec. & M. Co.
- Book Publishers**  
McGraw-Hill Book Co., Inc.
- Boring Tools, Car Wheel**  
Niles-Bement-Pond Co.
- Controller Regulators**  
Electric Service Supplies Co.
- Brackets and Cross Arms (See also Poles, Ties, Posts, Etc.)**  
Bates Expanded Steel Truss Co.  
Hubbard & Co.  
Lindsley Bros. Co.  
Ohio Brass Co.
- Brake Adjusters**  
Holden & White, Inc.  
Westinghouse Traction Brake Co.
- Brake Shoes**  
Amer. Brake Shoe & Fdry. Co.  
Barbour-Stockwell Co.  
Brill Co., The J. G.  
Columbia M. W. & M. I. Co.  
St. Louis Car Co.
- Brakes, Brake Systems and Brake Parts**  
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Brill Co., The J. G.  
Columbia M. W. & M. I. Co.  
General Electric Co.  
Holden & White, Inc.  
National Brake Co.  
St. Louis Car Co.  
Safety Car Devices Co.  
Westinghouse Traction Brake Co.
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Green Engineering Co.
- Brooms, Track, Steel or Rattan**  
Paxson Co., J. W.  
Zelnicker, Walter A., Supply Co., Inc.
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Jeandron, W. J.  
Morgan Crucible Co.  
United States Graphite Co.  
Westinghouse Elec. & M. Co.
- Brushes, Graphite**  
United States Graphite Co.
- Brush Holders**  
Anderson Mfg. Co., A. & J. M.  
Columbia M. W. & M. I. Co.  
Eureka Co.
- Buckets**  
Blaw-Knox Company
- Bushings, Case Hardened & Mangane**  
Bemis Car Truck Co.
- Cables. (See Wires and Cables.)**
- Carbon Brushes. (See Brushes, Carbon.)**
- Car Equipment. (For Fenders, Heaters, Registers, Wheels, etc.—See those headings.)**
- Car Trimmings. (For Curtains, Registers, Doors, Seats, etc.—See those headings.)**
- Car Panel Safety Switches**  
Westinghouse Elec. & Mfg. Co.
- Cars, Passenger, Freight, Express, etc.**  
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Brill Co., The J. G.  
Kuhlman Car Co., G. C.  
McGuire-Cummings Mfg. Co.  
St. Louis Car Co.  
Wason Mfg. Co.
- Cars, Second Hand**  
Electric Equipment Co.
- Cars, Self-Propelled**  
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General Electric Co.
- Castings, Brass, Composition or Copper**  
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Columbia M. W. & M. I. Co.  
Eureka Co.  
More-Jones Brass & Metal Co.
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St. Louis Car Co.  
Standard Steel Works Co.
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Bemis Car Truck Co.  
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St. Louis Car Co.
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Ohio Brass Co.  
Wood Co., Chas. N.
- Change Carriers**  
McGill Ticket Punch Co.
- Circuit Breakers**  
Automatic Reclosing Circuit Breaker Co.  
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General Electric Co.  
Westinghouse Elec. & Mfg. Co.
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Electric Service Supplies Co.  
Eureka Co.
- General Electric Co.**  
Hubbard & Co.  
Ohio Brass Co.  
Westinghouse Elec. & Mfg. Co.
- Cleaners and Scrapers Track—(See also Snow-Plows, Sweepers and Brooms.)**  
Brill Co., The J. G.  
Ohio Brass Co.
- Clusters and Sockets**  
General Electric Co.
- Coal and Ash Handling—(See Conveying and Hoisting Machinery.)**
- Coil Banding and Winding Machines**  
Columbia M. W. & M. I. Co.  
Electric Service Supplies Co.
- Coils, Armature and Field**  
Cleveland Armature Works.  
Columbia M. W. & M. I. Co.  
D & W Fuse Co.  
General Electric Co.  
Independent Lamp & Wire Co.  
Rome Wire Co.  
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General Electric Co.  
Westinghouse Elec. & M. Co.
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International Register Co., The
- Commutator Slotters**  
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General Electric Co.  
Westinghouse Elec. & Mfg. Co.  
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General Electric Co.
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- Condensers**  
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Eureka Co.  
Trigger Lock Reversible Controller Finger
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Eureka Co.  
General Electric Co.  
Westinghouse Elec. & Mfg. Co.
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Westinghouse Elec. & Mfg. Co.
- Converters, Rotary**  
General Electric Co.  
Westinghouse Elec. & Mfg. Co.
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- Conveyors, Coal & Ash**  
Portable Machinery Co.
- Conveyors, Portable**  
Portable Machinery Co.
- Conveying and Hoisting Machinery**  
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International Register Co., The  
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Samson Cordage Works.  
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Brill Co., The J. G.  
Ohio Brass Co.  
Van Dorn Coupler Co.  
Westinghouse Trac. B. Co.
- Cranes**  
Toledo Bridge & Crane Co., The
- Creosoting. (See Wood Preservatives.)**
- Cross Arms. (See Brackets)**
- Crossing Foundations**  
International Steel Tie Co.
- Crossing Signals. (See Signals, Crossing)**
- Crossings, Track. (See Track, Special Work)**
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Armco Iron Culvert & Flume Mfrs. Assn.  
Canton Culvert & Silo Co.
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St. Louis Car Co.
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Electric Equipment Co.  
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Griswold Machine Co., Geo. M.  
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- Derailing Devices. (See also Track Works)**  
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Electric Service Supplies Co.
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Wish Service, Inc., P. Edward
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- Door Operating Devices**  
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National Pneumatic Co., Inc.  
Safety Car Devices Co.
- Doors and Door Fixtures**  
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General Electric Co.  
Hale & Kilburn Corp.
- Doors, Folding Vestibule**  
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- Draft Rigging. (See Couplers)**
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Westinghouse Elec. & Mfg. Co.
- Fare Boxes**  
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International Register Co., The  
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Page Steel & Wire Co.
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Brill Co., The J. G.  
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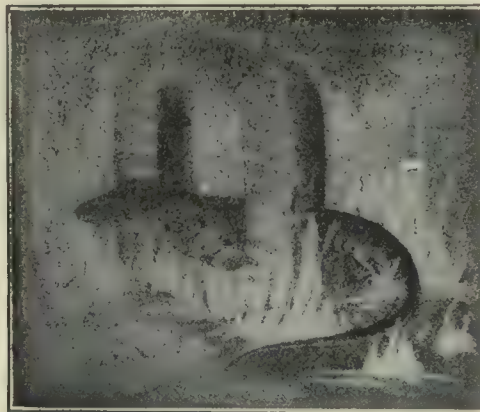
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**Furnaces.** (See Stokers)

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Nuttall Co., R. D.

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**Generators**  
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More-Jones B. & M. Co.  
Nuttall Co., R. D.  
Star Brass Works.

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Ohio Brass Co.  
St. Louis Car Co.

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Gold Car Heating & Lighting Co.  
Holden & White, Inc.  
Smith Heater Co., Peter

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Cooper Heater Co.  
Holden & White, Inc.  
Smith Heater Co., Peter

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Holden & White, Inc.  
Smith Heater Co., Peter

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Niles-Bement-Pond Co.  
Toledo Bridge & Crane Co., The

**Hose, All Kinds**  
Fairbanks Co., The

**Hose, Bridges**  
Ohio Brass Co.

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Niles-Bement-Pond Co.

## WHAT AND WHERE TO BUY

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Westinghouse Elec. & Mfg. Co.

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Drew Electric & Mfg. Co.  
Electric Service Supplies Co.  
General Electric Co.  
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Mitchell-Rand Mfg. Co.  
Westinghouse Elec. & Mfg. Co.

**Insulators.** (See also Line Material)  
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General Electric Co.  
Ohio Brass Co.  
Westinghouse Elec. & Mfg. Co.

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Hubbard & Co.

**Insurance, Fire**  
Marsh & McLennan

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Buckeye Jack Mfg. Co.  
Columbia M. W. & M. I. Co.  
Lackawanna Steel Co.  
National Ry. Appliance Co.  
Templeton, Kenly Co., Ltd.

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Reading Specialties Co.  
Zelnicker Supply Company, Inc., Walter A.

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Brill Co., J. G.

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Electrical Testing Lab's.

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General Electric Co.  
Westinghouse Elec. & Mfg. Co.

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General Electric Co.  
Westinghouse Elec. & Mfg. Co.

**Lamps, Signal and Marker**  
Nichols-Lintern Co.  
Ohio Brass Co.

**Lanterns**  
Fairbanks Co., The

**Lathe Attachments**  
Williams & Co., J. H.

**Lathes, Car Wheel**  
Niles-Bement-Pond Co.

**Lighting Regulators, Car**  
Holden & White, Inc.

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When writing to Advertisers in this publication you will confer a favor on both publisher and advertiser by mentioning the

**Electric Railway Journal**





Commercial Plant for Creosoting Poles by the Open-Tank System. Western Wood Preservers, Sandpoint, Idaho. (W. C. Assoc.)



## 100% American

This trade-mark stands for everything which the words "100% American" imply, the world over.

It is, first of all, the most efficient wood preservative on the market.

It is strictly honest in quality.

It is practical—adaptable to *all* conditions.

It is of American origin, a modern, distinctly American specification, developed by Americans in American laboratories, and is second to none in the world.

It is the *universal wood-preservative*, available everywhere in the United States, and eventually will be obtainable everywhere in the world.

Carbosota Creosote Oil is, of course, intended for non-pressure processes. It meets U. S. Shipping Board Emergency Fleet Corporation Specification No. 128, also U. S. Railroad Administration Specification No. R828A.

(Green wood cannot be effectively creosoted by non-pressure processes. It should be air-dry. In regions of moist, warm climate, wood of some species may start to decay before it can be air-dried. Exception should be made in such cases, and treatment modified accordingly.)

Specify "Carbosota" for results.

Technical service, specifications, etc., may be obtained gratis by addressing nearest office.

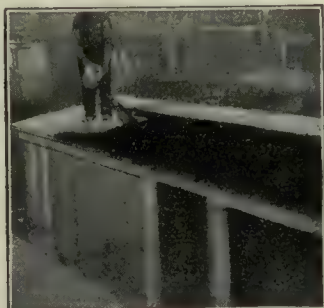
The *Barrett* Company

New York Chicago Philadelphia Boston St. Louis  
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THE BARRETT COMPANY, Limited: Montreal Toronto Winnipeg  
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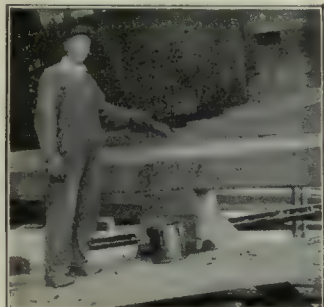
The Open-Tank Process: Simple wooden tank (lined with sheet iron) equipped with steam coils and small derrick.



Spraying roof deck of box car with Carbosota Creosote Oil (no paint used).



Creosoting car sills by open tank process.



Brush-treating siding surfaces of ship timbers with Carbosota.



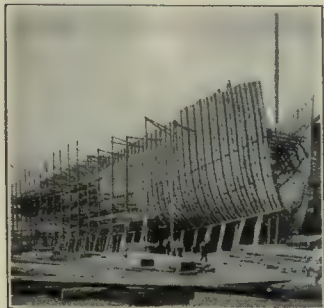
Spraying: Applying Carbosota to ends, mortises, and tenons (points of contact) of caps and stringers for trestle.



Brush-treating pole. Note use of a mop, which is more satisfactory than a brush.



Home-made creosoting tank, built of common lumber, lined with galvanized sheet iron soldered at the joints.



Siding surfaces of timbers brush-treated with Carbosota. (Courtesy Peninsula Ship Bldg. Co.)



1-gallon can, 5-gallon can, 10-gallon can, 1 wooden barrel. (Any quantity may be conveniently obtained, including tank-car quantities—10,000 gallons.)



Exceptionally artistic effect resulting from the use of Carbosota Creosote Oil as a paint.



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1914—1919

## Five Generations Crowded Into Five Years

In change of conditions the gap that divides 1919 from 1914 is as great as the gap that divides the Twentieth Century from the Eighteenth.

The man who looks to a return of the conditions of 1914 in adjusting business or social relations is as sadly out of joint as if he looked to a return of the conditions of 1800.

Think of the things these short five years have witnessed!

Machines loaded with men and cargoes fly through the air for long distances at the rate of a hundred miles an hour. Ships travel under the seas at speeds that rival the fastest sailing vessels of a hundred years ago. Men on the surface of the earth talk through wireless telephones to men flying a mile in air.

Great tonnage of freight is moved by trucks over open roads for greater distances and at higher speeds than were achieved by our early railroads.

Ships that required years for construction are built in a month. Time of production for commodities of all kinds has been cut and cut again. Processes of manufacture have been revolutionized.

America has passed from a debtor nation, owing billions, to a creditor nation, lending billions. Three-hundred thousand security holders in America have expanded into thirty million.

The impossibilities of sixty months ago have become common occurrences.

Financially, commercially, socially, the world has been turned upside down.

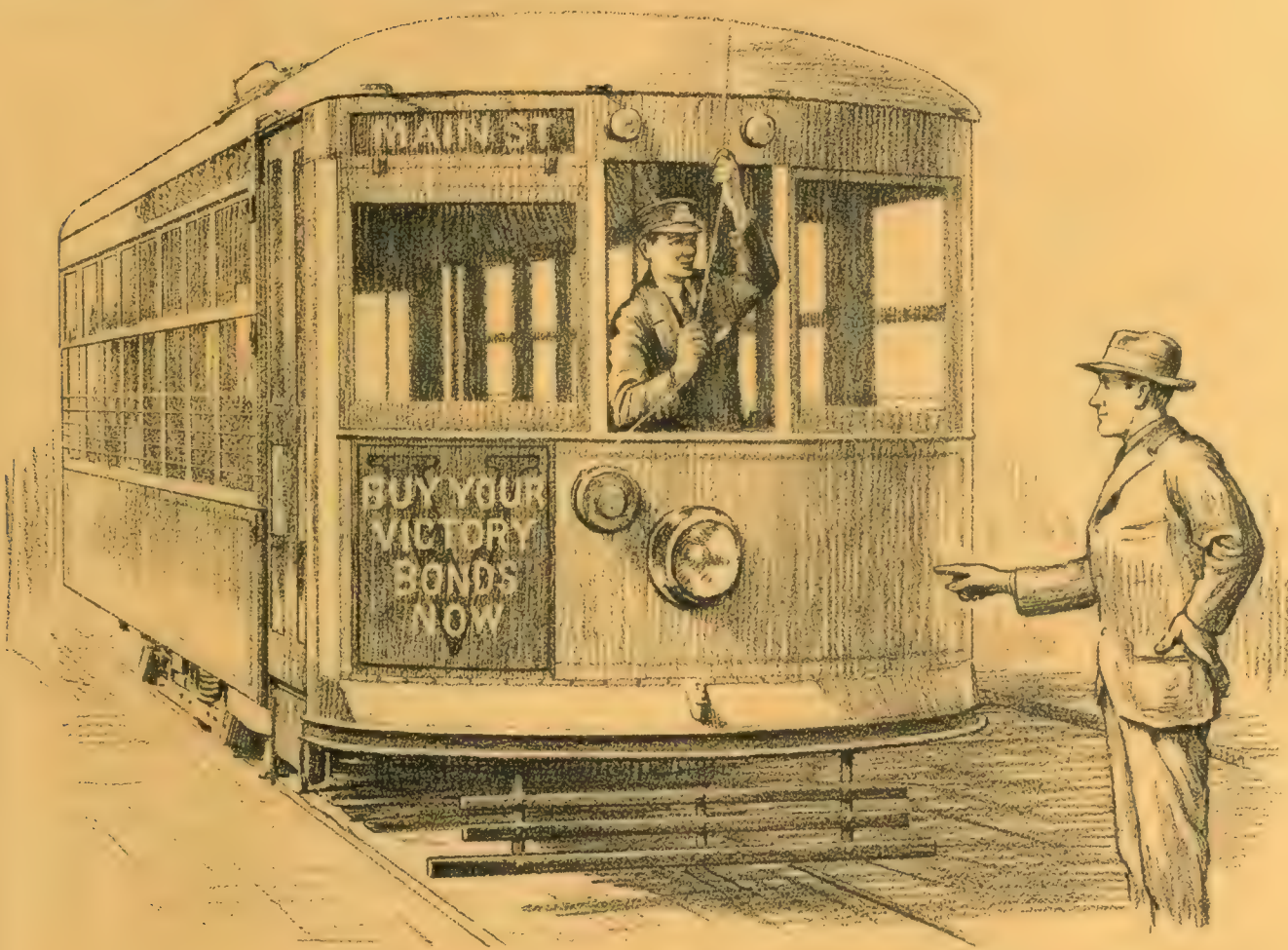
*We are in a new world.* The past and its conditions have gone never to return. We are living in a new era. It's time we realized it.

If you have something to sell—go ahead and sell it. If you need anything—go ahead and buy it. You will not be able to either buy or sell at the price level of five years ago. Stop thinking about it. Do business.

## Let's Go!

Space contributed by ELECTRIC RAILWAY JOURNAL





IT HAS A TAKING WAY

"Is the new car a place to take bond subscriptions, Mack?"

"Sure it is. It will take you and your subscription right to the booth where I signed up myself."

The Birney Safety Car has a "taking way" with the car men.

They like the "feel" of operating a light-weight car. The smooth, quick starts and stops make it easy to handle in crowded streets and save time. Stops can be "spotted" more accurately.

The simple and convenient controlling devices make the least demand on head and hands.

Ability to bring the car to a stop in the shortest possible time, and no question of leaving undone anything that ought to be done in case of emergency, relieves the operator of worry and danger.

Collecting fares, in addition to running the car, is not arduous. It keeps the operator comfortably busy and gives a variety to the work that makes it more interesting and tends to keep him alert and "on the job."

Having full charge of the car is much favored by the men. Watching, waiting and listening for the conductor's signal is irritating to many motormen and all

are glad to be rid of it. Undivided responsibility is considered decidedly preferable.

Apparently the carmen unanimously endorse the Birney Safety Car.

**BIRNEY**  
TRADE MARK  
**SAFETY**  
**CAR**

THE J. G. BRILL COMPANY  
PHILADELPHIA, PA.

G. C. KUHLMAN CAR CO.  
CLEVELAND, OHIO



AMERICAN CAR COMPANY  
ST. LOUIS, MO.

WASON MANUFACTURING CO.  
SPRINGFIELD, MASS.



## Automatically Controlled Railway Substation

Three years ago the General Electric Company developed and installed the first automatically controlled substation for railway service. Since that time a total of fifty equipments have been sold in capacities ranging from 200 kw. to 1500 kw.

25-17



# General Electric Company

General Offices:  
Schenectady, N. Y.



Sales Offices  
in all large cities







